STMASTER: Modern Metals, 435 North Michigan Avenue, Chicago 11, Illinois. Return Postage Guaranteed—Form 3579 Requested. • August, 1959

MODERN METALS

Lockheed Aircraft Corp.
Missile Systems Division
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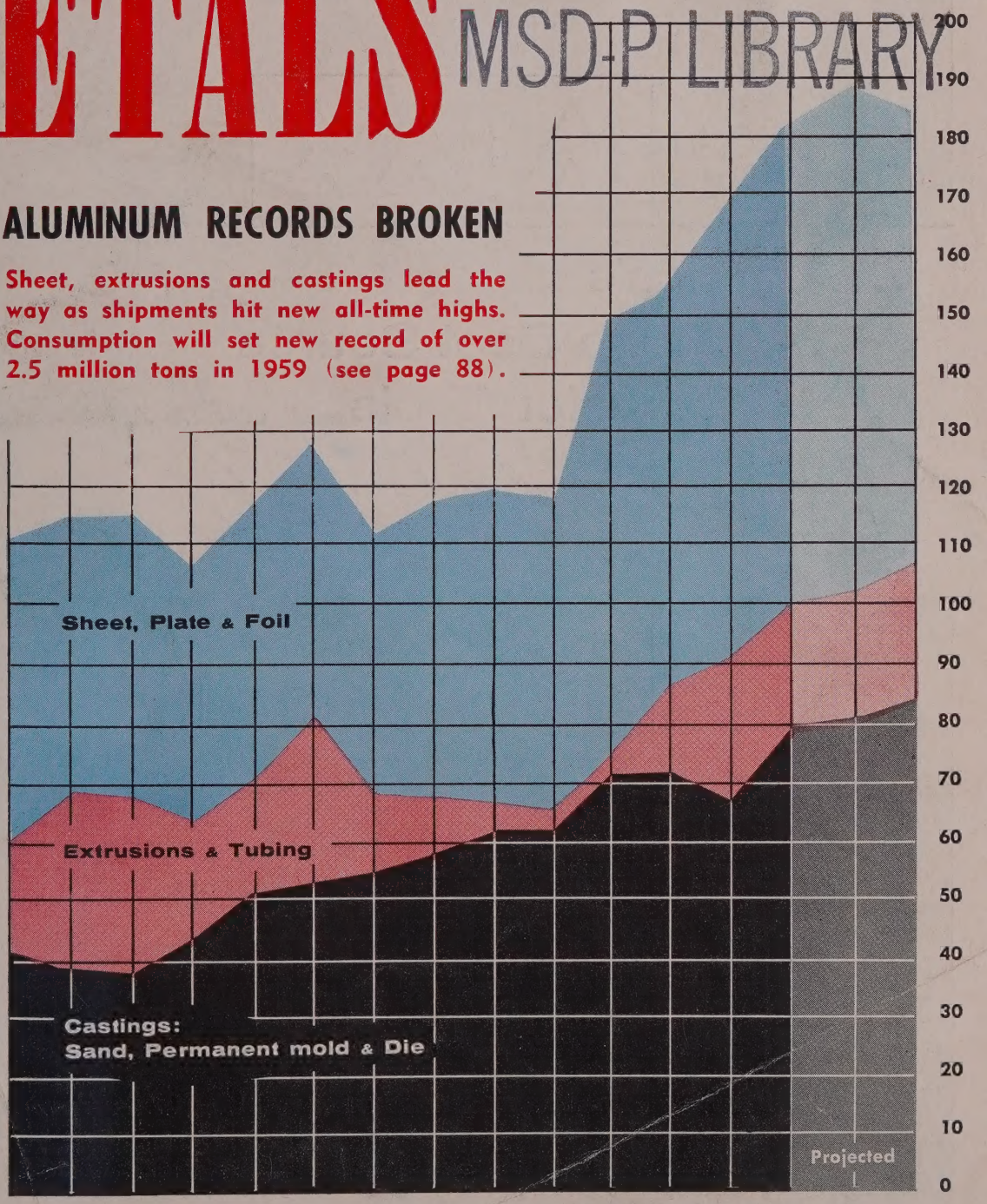
3251 Hanover St.
Palo Alto, Calif.

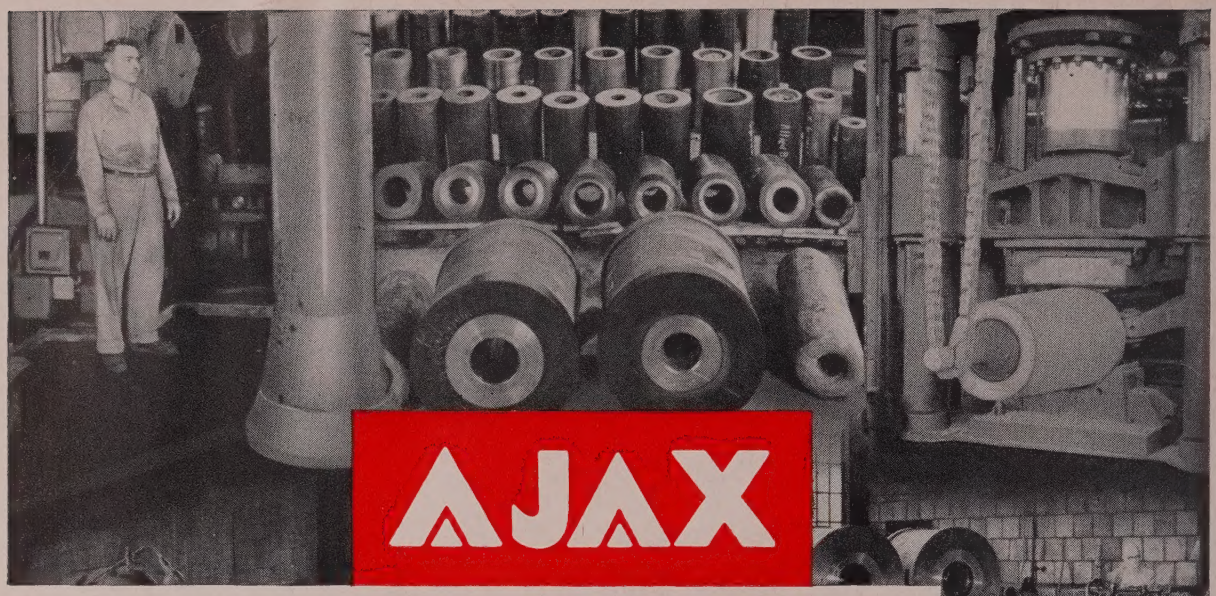
AUG 26 1959

MSD-P LIBRARY

ALUMINUM RECORDS BROKEN

Sheet, extrusions and castings lead the way as shipments hit new all-time highs. Consumption will set new record of over 2.5 million tons in 1959 (see page 88).





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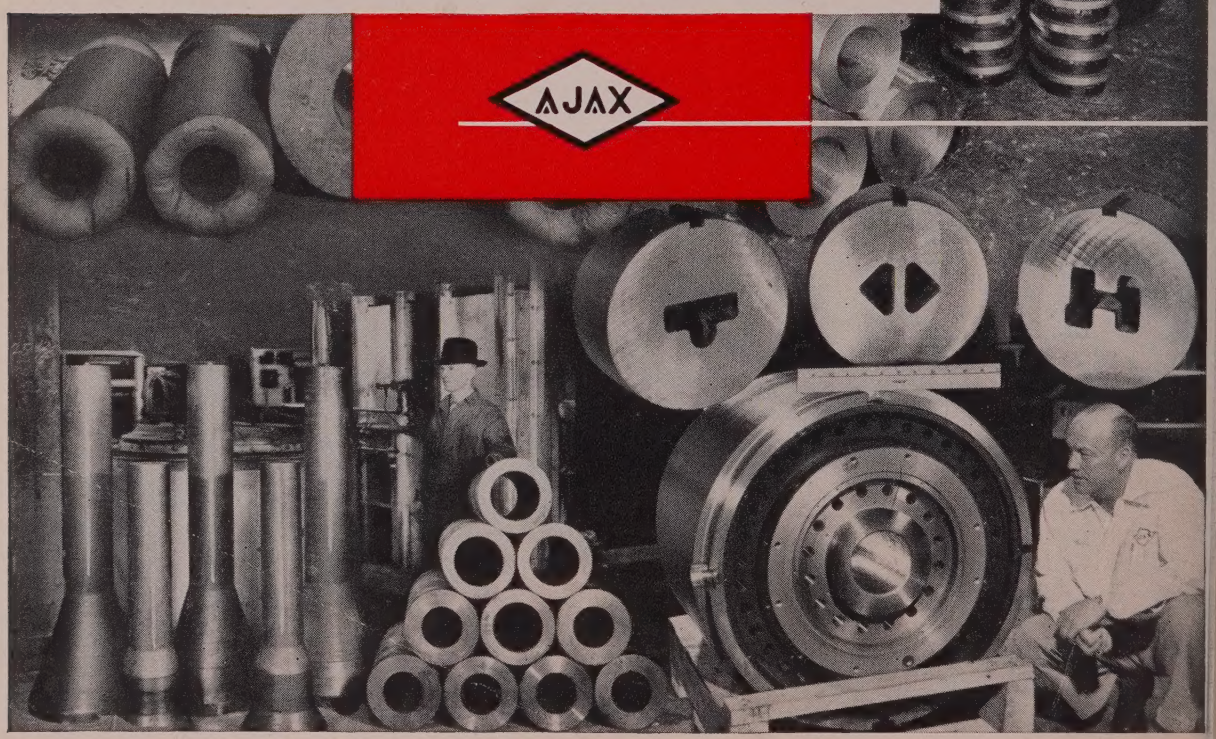
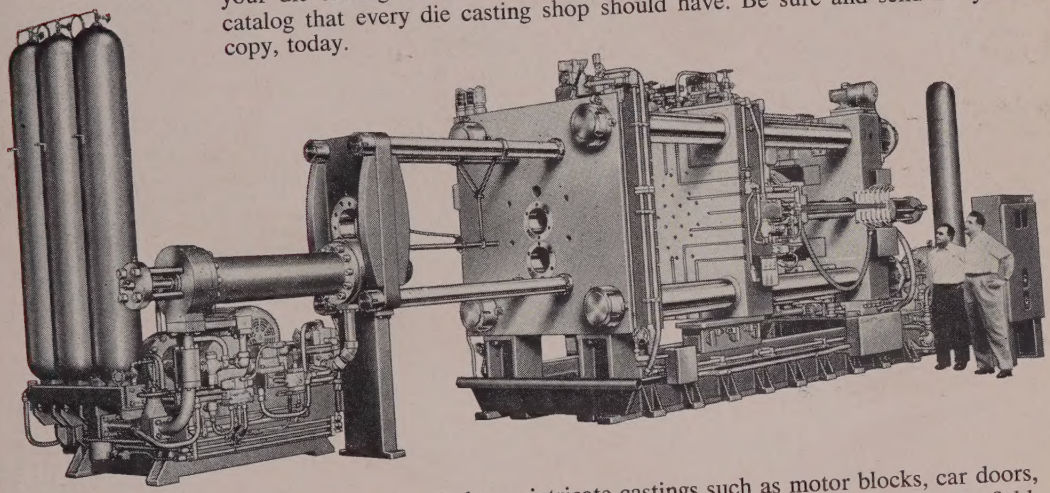


AJAX

FILE NOTE:

There Are 17 Cast-Masters For Every Die Casting Need

Whether your requirements call for precision parts of a few ounces in weight or a massive casting of 85 pounds, there's a Cast-Master to fit the job. It's a line that sparkles with a range of models, each with outstanding features for your die casting needs. The chart below is reproduced from the brand new catalog that every die casting shop should have. Be sure and send for your copy, today.



MODEL 60A Cast-Master for exceptionally large, intricate castings such as motor blocks, car doors, large housings, etc. This huge 2000 ton Cast-Master has proved its usefulness in the field.

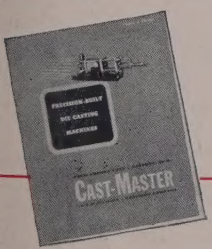
THE CAST-MASTER LINE FOR PRECISION DIE CASTINGS

PLUNGER GOOSENECK TYPE: *Zinc, Lead and Tin*

MODEL		7Z	9Z	10Z	15Z	20Z	30Z	40Z	50Z
Locking Pressure (Tons)		100	200	300	400	500	600	800	1000
Tie Bar Centers (In.)	Ver.	16	19½	23	26	30½	32½	37	46
	Hor.	16	19½	23	26	28½	32½	40	46
Tie Bar Diameter (In.)		2½	3½	4	5	5½	6	7	8
Space Between Tie Bars (In.)		13½x 13½	16x 16	19x 19	21x 21	23 Hor. 25 Ver.	26½x 26½	33 Hor. 30 Ver.	38x38
Die Mounting Plates (In.)		3½x 21½x 21½	4½x 26x 26	5x 32x 32	6x 36x 36	7x 38x 40	8x 48x 44	9x 52x 54	Stat. 12x60x60 Mov. 10x60x60
Die Thickness (In.)	Min.	4	6	8	8	8	12	20	20
	Max.	19	24	24	28	36	38	38	44
Die Stroke (In.) (Adjustable)	Min.	4	6	6	8	9	12	18	18
	Max.	8	10	10	12	15	18	24	24
Injection Cylinder Dia. (In.)		2½	3⅛	3⅝	4⅛	4⅛	4⅝	4⅝	6⅛
Injection Cylinder Stroke (In.)		6½	7¼	7¼	7¼	7¼	10	10	14
Metal Pot Capacity (Lbs.)		800	1000	1000	1000	1000	2000	2000	3000

COLD CHAMBER TYPE: *Aluminum, Brass and Magnesium*

7A	9A	10A	15A	20A	30A	40A	50A	60A
100	200	300	400	500	600	800	1000	2000
16	19½	23	26	30½	32½	37	46	62
16	19½	23	26	28½	32½	40	46	62
2½	3½	4	5	5½	6	7	8	11
13½x 13½	16x 16	19x 19	21x 21	23 Hor. 25 Ver.	26½x 26½	33 Hor. 30 Ver.	38x38	51x 51
3½x 21½x 21½	4½x 26x 26	5x 32x 32	6x 36x 36	7x 38x 40	8x 48x 44	9x 52x 54	Stat. 12x60x60 Mov. 10x60x60	18x 80x 80
4	6	8	8	8	12	20	20	20
19	24	24	28	36	38	38	44	54
4	6	6	8	9	12	18	18	22
8	10	10	12	15	18	24	24	36
3	4⅛	4⅛	4⅝	4⅝	5⅛	5⅝	6⅛	8¼
11	14½	12 to 16 Adj.	12 to 17½ Adj.	14 to 19½ Adj.	16 to 22 Adj.	18 to 24 Adj.	22 to 28 Adj.	30 Min. 44 Max.



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Send for your copy of the new Cast-Master Catalog CM-100 just off the press.

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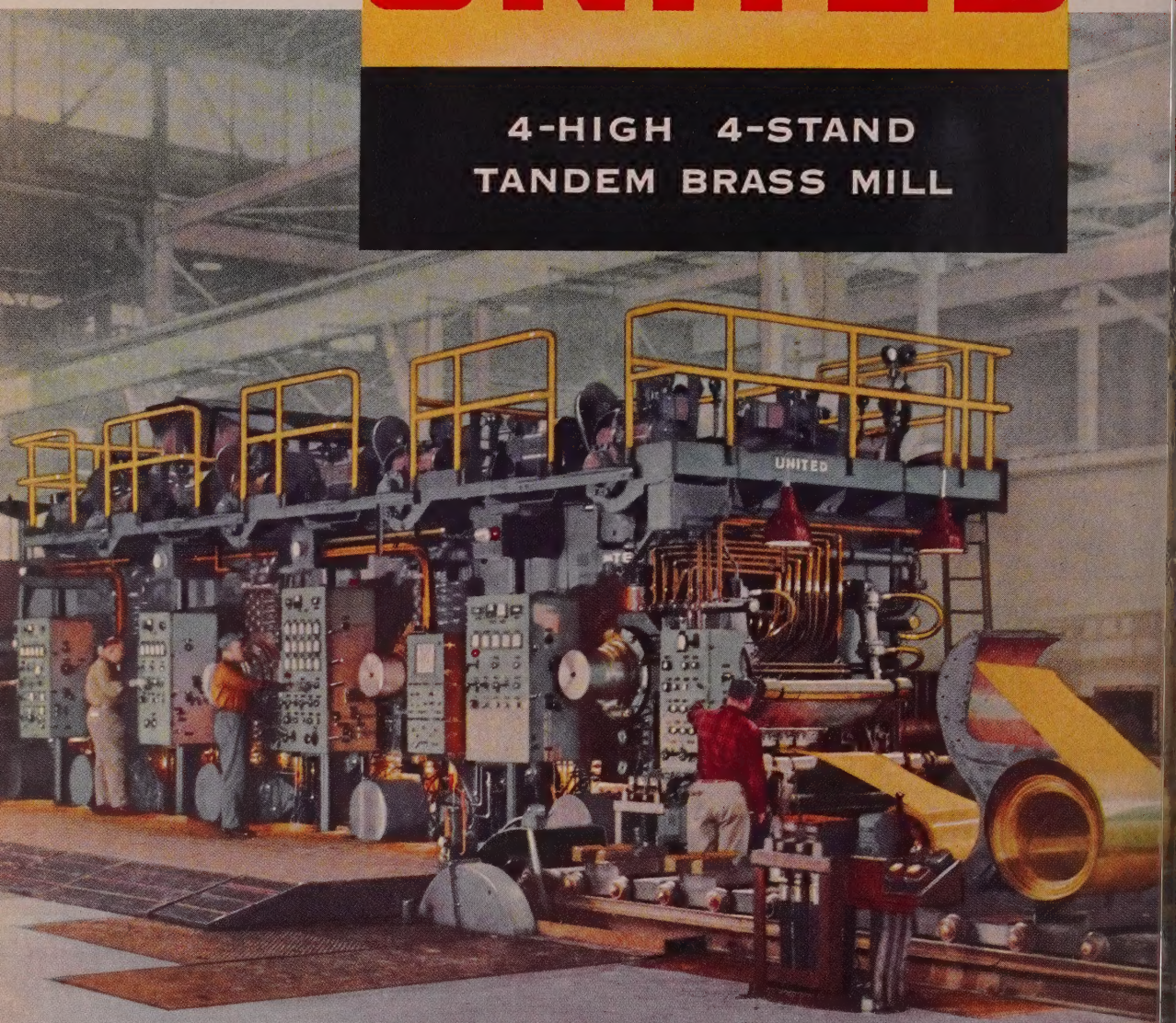

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Available in thicknesses ranging from .250″ to 6″, widths from 24″ to 120″ and lengths from 36″ to 480″, Reynolds Wrought Aluminum Tooling Plate offers close tolerances and maximum freedom from stress. It offers new production savings for light and heavy industry, in applications ranging from aircraft manufacturing to electronics fabrication. Plastic molds, drill plates, templates, assembly fixtures, structural supports, press blocks *all* have been successfully made from easy-working and lightweight wrought aluminum tooling plate.

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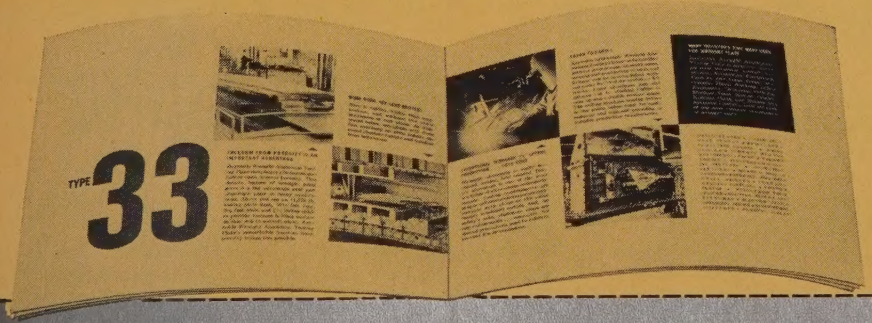

Contact your local Reynolds branch office, or send in the coupon below for your free copy of the Reynolds brochure on this new tooling plate. Complete data on specifications and availability.

Reynolds Metals Company
P.O. Box 2346-KL, Richmond 18, Virginia

Please send me full information on **REYNOLDS WROUGHT ALUMINUM TOOLING PLATE**

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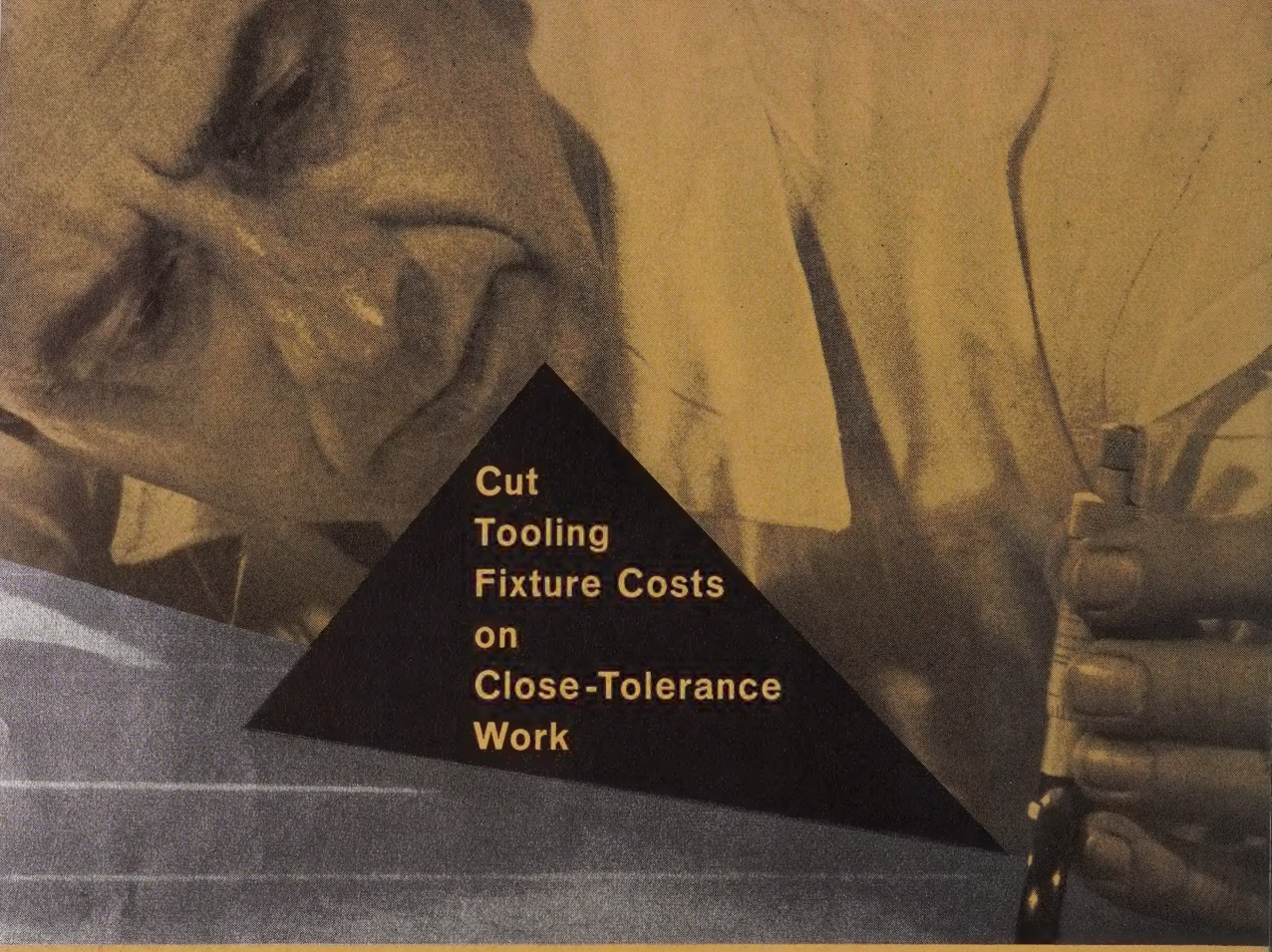
REYNOLDS ALUMINUM



...specify
Reynolds Type 33
Wrought Aluminum Tooling Plate

Reynolds Type 33 Wrought Aluminum Tooling Plate provides stability, flatness, finish, and *workability* never before possible in so low-cost a plate.

Its *32 micro-inch finish* assures extremely smooth surfaces and close gauge tolerances. It provides minimum residual stress for maximum stability—no distortion when sawed or milled. Because this plate is *wrought*, it offers freedom from porosity, and is usable in more tooling applications. Reynolds Type 33 Plate is *extra rigid*—more rigid than magnesium, less brittle than cast plates.

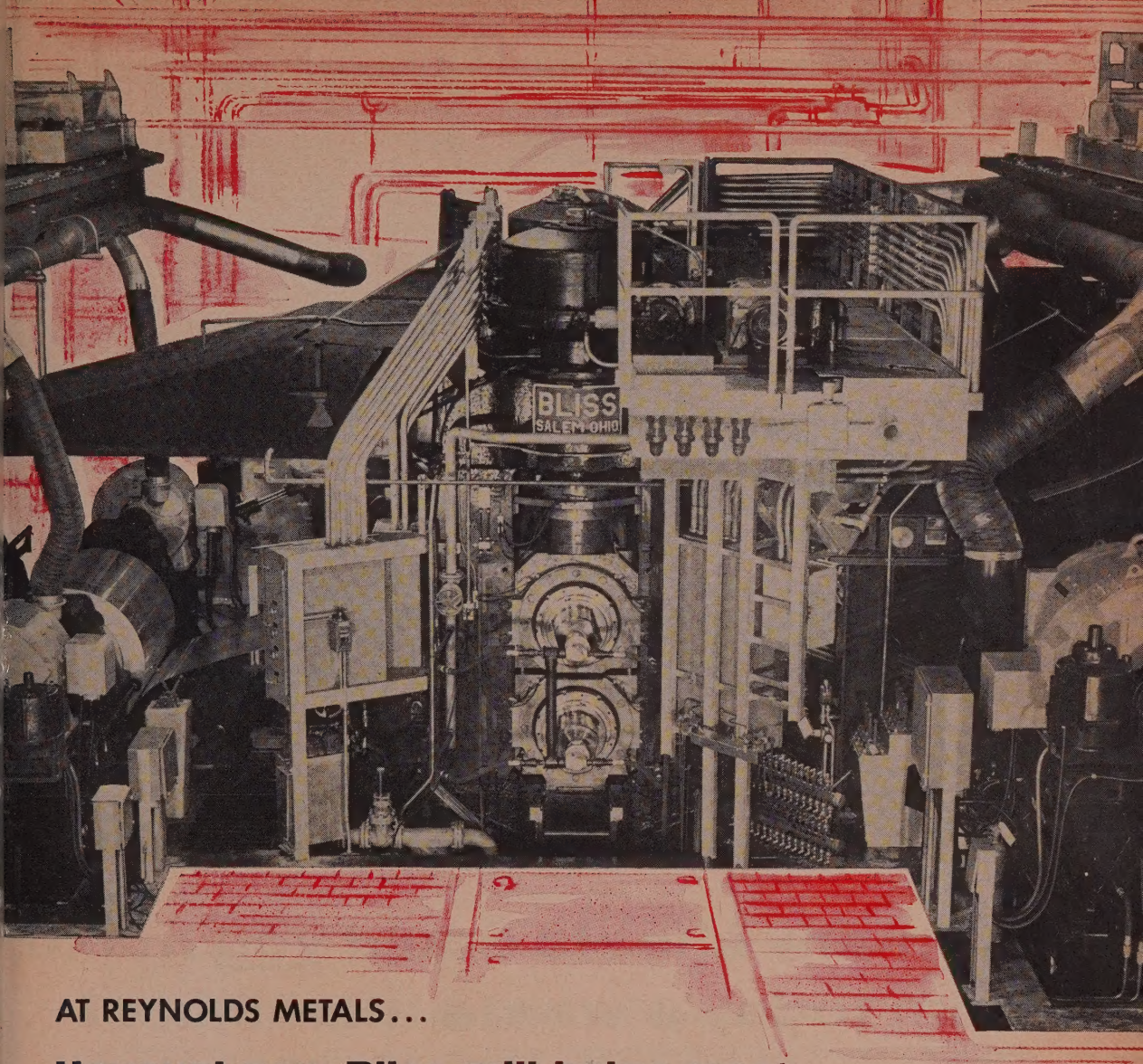
And, of course, aluminum wrought plate is lightweight, easy to handle; it cuts labor and permits use of smaller handling equipment—can frequently be handled by one man. Easy to machine, cut, form and weld, wrought aluminum plate can lower production and tool costs, as well.

For complete information on Reynolds Type 33 Wrought Aluminum, see your nearest Reynolds Aluminum Distributor or Reynolds Sales Office. Or, write to the *Reynolds Metals Company, Box 2346-KL, Richmond 18, Virginia.*

Watch Reynolds TV show—"WALT DISNEY PRESENTS"
—every week on ABC-TV

See next page for details——→

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM



AT REYNOLDS METALS...

Unusual new Bliss mill helps meet growing demand for bright aluminum strip

First of its kind to be installed by Reynolds Metals Company for sheet operations, this new Bliss two-high cold reduction mill recently went into operation at Reynolds' Alloys Plant, near Sheffield, Ala.

A 66-inch mill capable of speeds up to 1000 fpm and reductions as high as 50%, the new mill has been especially designed for rolling bright aluminum strip, now being used in increasing quantities for both decorative and structural applications by the automotive, aeronautical, trailer and other industries.

Among the unusual design features built into the mill by Bliss' Rolling Mill Division are a continuous line flow coolant filtration system and a special heating arrangement that maintains the proper shape of the rolls. Electronic controls provide gage consistency in high speed acceleration and deceleration, as well as permitting the operator to detect difficulties at any point in the rolling operation from his position at the control panel.

According to Reynolds Metals, the new Bliss mill is part of a $65,000,000 expansion and modernization program now going on at the Alloys Plant.

For more examples of Bliss rolling mill and accessory equipment currently in use in both ferrous and nonferrous rolling plants, write us today for your complimentary copy of our new 84-page Rolling Mill Brochure, Bulletin 40-B.

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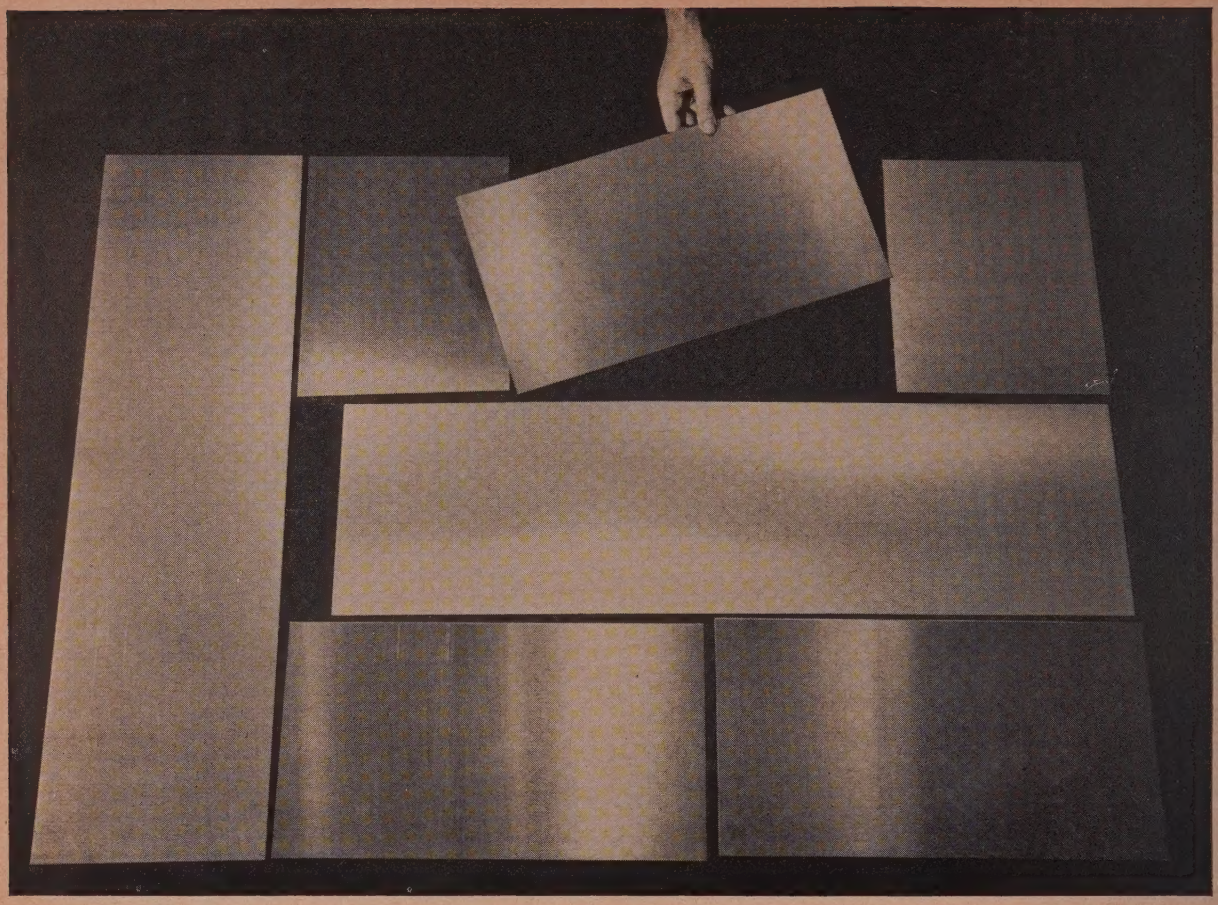
Bliss is more than a name . . . it's a guarantee

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

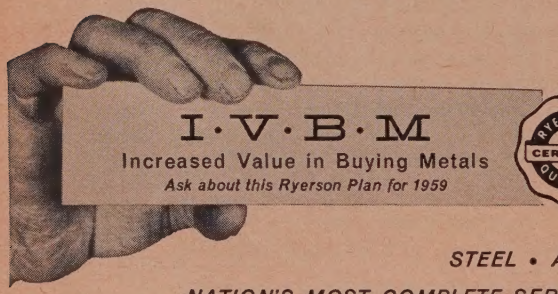


How many sheets could you make from today's waste aluminum?

If you tend to shrug off scrap as an unavoidable business loss, here's a plan that can change your thinking. It's the Ryerson Aluminum Sheet Plan that makes exact lengths and widths available to most users—generally on a *net weight basis.*

Under this plan, you order the exact sizes you need for your production runs—and Ryerson produces them quickly from coil stock on the most modern and accurate slitters and cut-to-length lines. You thus avoid buying metal that you cannot use . . . save the time and labor of processing within your own plant. And in addition, Ryerson can schedule deliveries to match your production pace, enabling you to convert storage space to more productive use and release capital tied up in inventories.

Here you'll find the widest selection of alloys, tempers and thicknesses plus expert technical help on selection and fabrication problems. So ask your Ryerson representative to review your production requirements with you and show you how to eliminate your scrap problems immediately.



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MODERN METALS

Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

ON THE COVER: Back in December, we clambered out on a limb and predicted "a near-record year for aluminum shipments in 1959." As the chart on this month's cover shows, we will probably turn out to have been comfortably on the conservative side. Aluminum shipments — led by sheet, extrusions and castings — seem certain to set a fat, new record this year. In fact, July was the biggest month in the aluminum industry's history. We even hear that prices are beginning to strengthen. The general recovery has played a major role, of course, but aluminum has bounced back faster and farther than the economy as a whole. And to top it off, the industry looks to be in for a busy 1960, too.

•

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Modern Metals is published monthly by Modern Metals Publishing Co., not incorporated, at Barrington, Ill. Printed in U.S.A. Subscription in the United States: To fabricators and users of light metals—$3.00 one year; $5.00 two years; $6.00 three years. To all others in U.S.—$10.00 per year. Foreign $8.00 one year; $13.00 two years; $18.00 three years. Back issues: $1.00 each.

Modern Metals has by far the world's largest circulation among light metals fabricators, foundries and product manufacturers who use aluminum, magnesium, and titanium. Circulation: Now over 14,000 copies per month. Acceptance under controlled circulation at Barrington, Ill.

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PUBLISHER
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Modern Metals

VOLUME XV **AUGUST 1959** **NUMBER 7**

LETTERS 10
HERE & THERE 14
NEW ENTERPRISE 18
USEFUL DATA 22
NEWS, PRODUCTS & PEOPLE 66
LOOKING AHEAD 88

COLD EXTRUDING STRONG ALLOYS ..... R. A. Quadt **26**
The cold extrusion process, originally developed for producing complex shapes in strong aluminum alloys, is also used to make parts in hard, costly metals.

ALUMINUM IN AUTO BUMPERS ..... E. P. White **34**
With power accessories and styling emphasis overloading the front end of today's auto, aluminum bumpers could help lick weight distribution problems.

WELDING THE TOUGH ONES **40**
Special positioners solve knotty problems in welding of exotic metals as well as aluminum, steel, etc. Welding planishers strengthen and smooth welded joints.

LIGHT, STRONG BUILDING PANELS **50**
Aluminum extrusions and fiberglas sheet are combined in extremely lightweight, colorful Sanpan panels.

NEW STRUCTURAL EXTRUSION ALLOY **52**
Alcan B51S weldable aluminum-magnesium series alloy is strong, heat treatable, boasts attractive extruded finish.

REDESIGN IN DIE CASTINGS ..... Kim Darby **54**
Resourceful redesign program with aluminum die castings sparks sales of Montgomery Ward's power mowers.

QUICK CORES FOR CASTINGS ..... George Horner **62**
Use of standard corn cereal binder at aluminum foundry boosts green strength and sag resistance of cores.

FINANCING EXPANSION ..... R. V. Keller **64**
It can be a tough problem for any metalworking company that has its capital tied up in accounts receivable. A financial expert describes one way out.

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EXTRUSION
BILLET
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Letters

Weathervanes

Sirs:

In your July issue a letter from "L", New York, asking about a possible source for aluminum weathervanes.

I suggest they contact Remington Hardware, 102 Greenwich Street, New York 6.

We manufacture for them a complete line of cast aluminum weathervanes in rather large volume.

"A" — Pennsylvania

MM—Seems as how some potential buyers of weathervanes want them color anodized.

Aluminum Flagpoles

Sirs:

We are interested in information on aluminum flag poles. We would appreciate it if you could furnish us with the name and address of any manufacturer of aluminum flag poles you may have on file, so that we may obtain further information.

"B"—Nova Scotia

MM—There are several aluminum flagpole manufacturers. Hubbard & Co., Pittsburgh, Pa., manufacturers of tapered aluminum poles for street lighting, might qualify.

Welding Equipment

Sirs:

Would you please give me the address of the Linde Co., producer of the Sigmette welding torch as described in your June issue.

"T"—North Carolina

MM—The address of the Linde Company is: 420 Lexington Avenue, Room 2840, New York 17.

India Needs Flexible Pipe

Sirs:

We are interested in contacting a firm in the U.S.A. that manufactures flexible pipe for enclosing electrical wire and cable.

If you can send us the names, we would be very much obliged.

"A" — Calcutta

MM—If any manufacturer wants to contact "A" in India, we'll glady pass along the letters.

Australian "Tent"

Sirs:

We note that you devoted space in July to the Reynolds $25,000 Architectural Award, the Music Bowl in Melbourne, Australia — in fact you put it on the cover. . . .

In my opinion, this isn't the greatest use for aluminum that has come down the pike in recent months. Seems to me you can find lots more exciting things to write about. . . .

"J" — New York

MM—The Sidney Myer Music Bowl certainly qualified as an exciting architectural achievement; otherwise a distinguished group of architects would not have selected it. Remember, please, aluminum satisfied some exacting acoustical requirements besides meeting structural design needs.

The Reynolds $25,000 award went to its architects because it was "off beat," not the usual aluminum building — which too frequently is poorly designed and constructed. They must look for the unusual.

We are sure that Reynolds, and the jury

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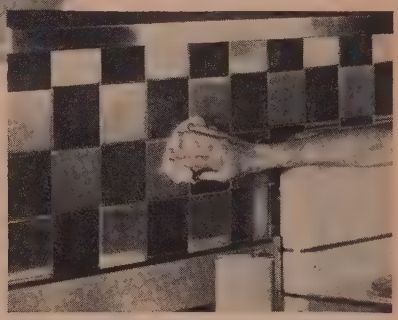

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and you like service, check with ANACONDA ALUMINUM

How can an aluminum supplier best satisfy your needs?

By precisely meeting your product specifications? By offering a wide enough product range to fill your needs? By shipping your order on time?

If these are your concepts of real customer service, then check with Anaconda Aluminum because they're ours, too.

It starts with prompt scheduling of your order—made possible by the flexibility designed into Anaconda Aluminum's modern facilities. Skilled aluminum craftsmen constantly check to make sure your aluminum matches your specifications—and that it's shipped on time.

Anaconda Aluminum combines these custom production methods with facilities large enough to fill a wide range of needs—pig and ingot, coiled and flat sheet, rod, bar, structurals, tubing and other extruded shapes.

If you like this brand of service, call your local Anaconda Aluminum representative, or write our General Offices, Dept. M-8, Louisville 1, Kentucky.

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And the cost is sure low — only $40 per insertion on an annual basis.

Want details? Write me.

Dick Pulliam

MODERN METALS

Tribune Tower
Chicago 11

of architects, didn't view it as the greatest thing since the pyramids. The important thing about these annual awards, as we see it, is that they stimulate architects toward using aluminum. If it helps create new ideas, then this annual award is worth the cost, should be encouraged.

Similar awards for consumer goods like irons, cars, utensils, sports equipment, television, boats, etc., might also be worthwhile.

Double-Action Press

Sirs:

Will you please let me know if it is possible to purchase a copy of the magazine article "Double-Action Extrusion Press Sheaths Cable Continuously" taken from your magazine "Modern Metals" dated May, 1959? Thank you.

"Z" — Connecticut

MM—We didn't reprint this story, but have sent you tear sheets.

Aluminum Crosses

Sirs:

I was given your address to find out where I could get a line on some aluminum crosses for grave markers. I have suggested that they would sell very good. Please let me know if you make them about 20 inches high or where I could get them.

"M" — Illinois

MM—We've never run across a manufacturer of grave crosses. Can anyone help "M"?

Finishes for Aluminum

Sirs:

Have you ever compiled and published a survey on finishes for aluminum? We are using more and more aluminum and may need a finishing department soon.

Anything you can supply us with will be helpful.

"M" — Michigan

MM—We recently surveyed 1000 subscribers and asked what they used in the way of coatings, finishes, or whether they had the work done outside, etc.

We had over 300 replies indicating great interest in the subject. Our September issue will be devoted to finishes for aluminum and magnesium, and we hope to make it the most complete and authoritative roundup of light metals finishing methods ever published. Emphasis will be on actual operating procedures — from cleaning and pretreatment to the application of mechanical, chemical, electro chemical, organic and inorganic finishes. Materials and equipment needed to apply these finishes will also be included.

We'll send you the September issue soon as it's off the press.

CHEMICAL MILLING

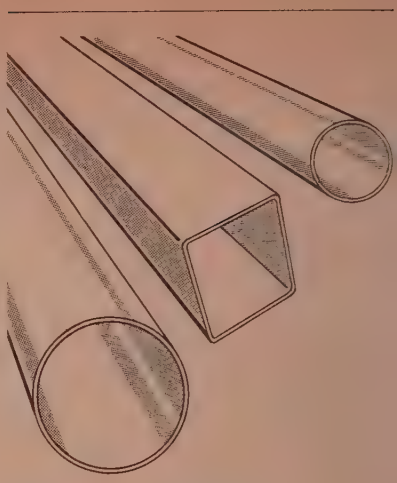
Sirs:

In your August 1958 issue you published an article which is of considerable interest to us here at General Electric. The article is entitled, "Chemical Milling Broadens Magnesium-Thorium Alloy Use in Missiles."

Would you please send me a copy of this article if it is available. I would also like to obtain your permission to reproduce and circulate this article to members of our manufacturing engineering staff.

"R"—New York

MM—We have sent you tear sheets of the article. You have our permission to reproduce the article if you wish.



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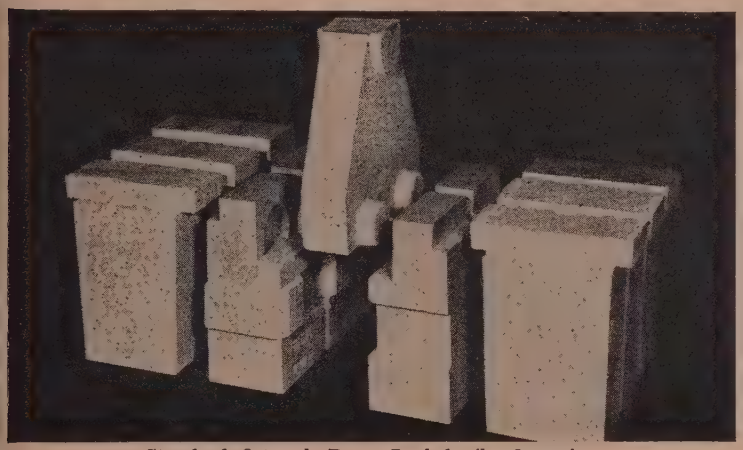
TILE SUSPENDED ARCHES FOR ALUMINUM FURNACE ROOFS:

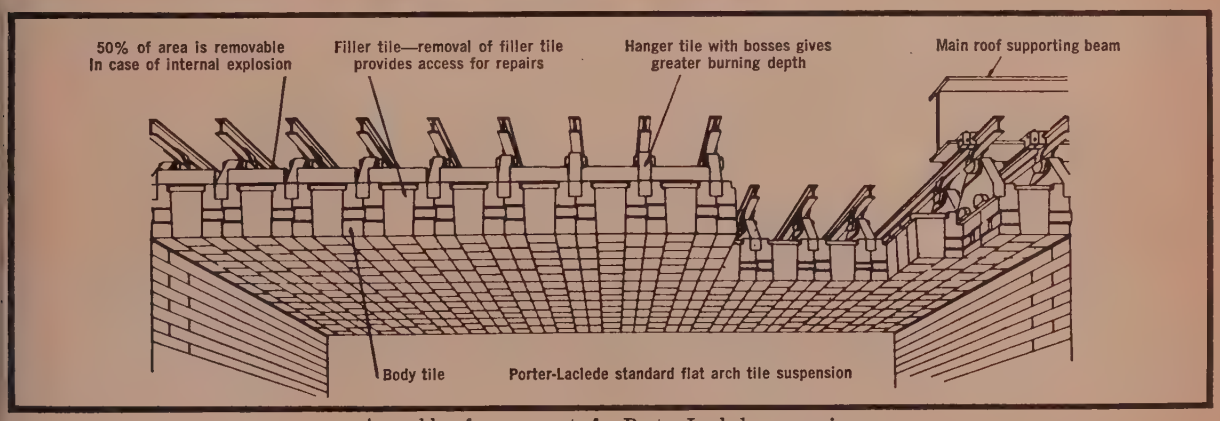
Porter-Laclede suspension is a "safety valve" against aluminum furnace explosions



Standard, flat arch, Porter Laclede tile suspension.

Looking for real blow-off protection? A Porter-engineered, Laclede Tile Suspended Arch "gives" with any serious explosive force, taking pressure off walls and bottom. Keeps walls and bottom in tact; no dangerous metal escape.

After an explosion, or where roof repairs are required, this roof can be "hot patched" . . . by replacing individually damaged tile, *without shutting down!*


50% of area is removable In case of internal explosion
Filler tile—removal of filler tile provides access for repairs
Hanger tile with bosses gives greater burning depth
Main roof supporting beam
Body tile
Porter-Laclede standard flat arch tile suspension

Assembly of components for Porter Laclede suspension.

Compare these Porter features:

- High safety factor
- Unequaled ease of installation and repair
- Strong resistance to erosion and spalling with Duo-Seal tile
- Unique provision for expansion
- Strong construction—a test load of 1,000 lbs. supported from one hanger tile
- Elimination of cumulate load against tile on slopes
- Applicable to any roof contour

Porter Tile Suspension can be fabricated from any specified refractory material. For complete information on aluminum furnace roofs, or *any* refractory application, write: *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*

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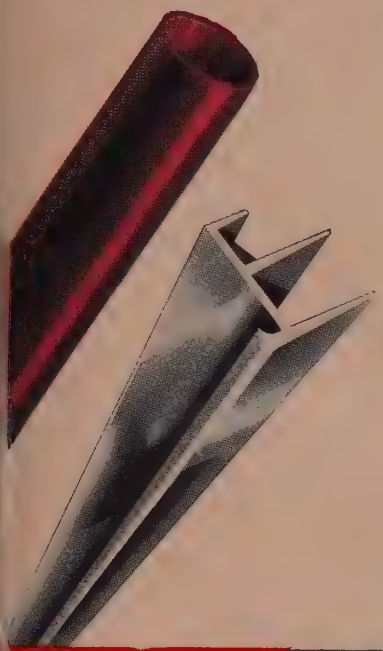
Here and There

Air Terminal Walkways » » The aluminum industry has an excellent chance to cash in on the burgeoning air terminal traffic problem caused by today's larger jet plane passenger loads. It isn't unreasonable for 40 or 50 passengers to amble out to a waiting prop-type plane and climb the stairs to the fuselage. But jet air travel, with its unit loads of 100 or more passengers, more than doubles the time needed to load or unload. Solutions involve the design of enclosed ramps or elevated walkways extending from the waiting room to the plane's entryway. Insofar as the plane's wingspread will permit, the ship taxies up close to the terminal, after which a movable ramp or elevated passageway is swiveled into position between plane and waiting room. Another design is a telescoping type of enclosed walk which is extended to the plane's entryway from the terminal's upper level waiting room. In either case, groups of passengers are protected from the weather and are handled more quickly. Disabled passengers have it easier, too. Another version is a motor truck-mounted "waiting room" to carry passengers from the upper level of a terminal to a jet plane waiting at the head of the runway. Regardless of design, though, aluminum is a natural application for such structures.

"More Payload — More Profit" » » That well-worn phrase seems to be getting home to over-the-road haulers of all kinds of materials and products because aluminum tank trucks and trailers are seen on the highways with increasing frequency. The slogan is also being heeded by automobile haulers, the companies that deliver new autos from factory to dealers throughout the U. S. and Canada. The normal life of these carriers is reckoned at 10 years — more than enough time for an operator of an aluminum trailer to earn back the added cost of his vehicle. A Canadian operator offers figures proving the value of the lighter vehicle. Annual savings in license fees is $56; increase in annual earnings comes to $1800 (by reason of his ability to transport five autos on a year-round basis, instead of cutting the load to three in the spring when highway surfaces are subject to damage from overloads); saving on gasoline total $850; annual savings in painting is $35. The total annual savings is $2741 which, over a ten-year period, amounts to $27,410. Subtracting the $2000 representing the difference in cost of his aluminum equipment compared with steel, he comes up with a lifetime saving of $25,410. The figures may vary but the story is the same wherever aluminum takes over.

Dilemma in Detroit » » With the announcement in recent months that the Big Three auto makers were introducing their concepts of the "compact" car, it was easy to see that a knock-down, drag-out three-cornered fight was shaping up between the foreign small car producers, the Big Three, and the domestic producers of smaller cars, Studebaker and American Motors. Now something new has been added: The Big Three are planning to give something to sell to their so-called

ONE OF THE WORLD'S MOST MODERN TUBE MILLS IS LOCATED IN DECATUR, ALABAMA*



South of the Mason-Dixon line—in Alabama—is a plant that is known as one of the world's most modern tube mills.

It's Wolverine Tube's Decatur plant and from its quarter-mile long reaches comes a seemingly never-ending stream of drawn and extruded copper, copper alloy and aluminum tube and extruded aluminum shapes.

Wolverine Tube is proud that it has been able to play such an important part in the Southland's industrial growth—depends on this plant to provide fast, convenient service to the ever-expanding south and south-eastern market areas.

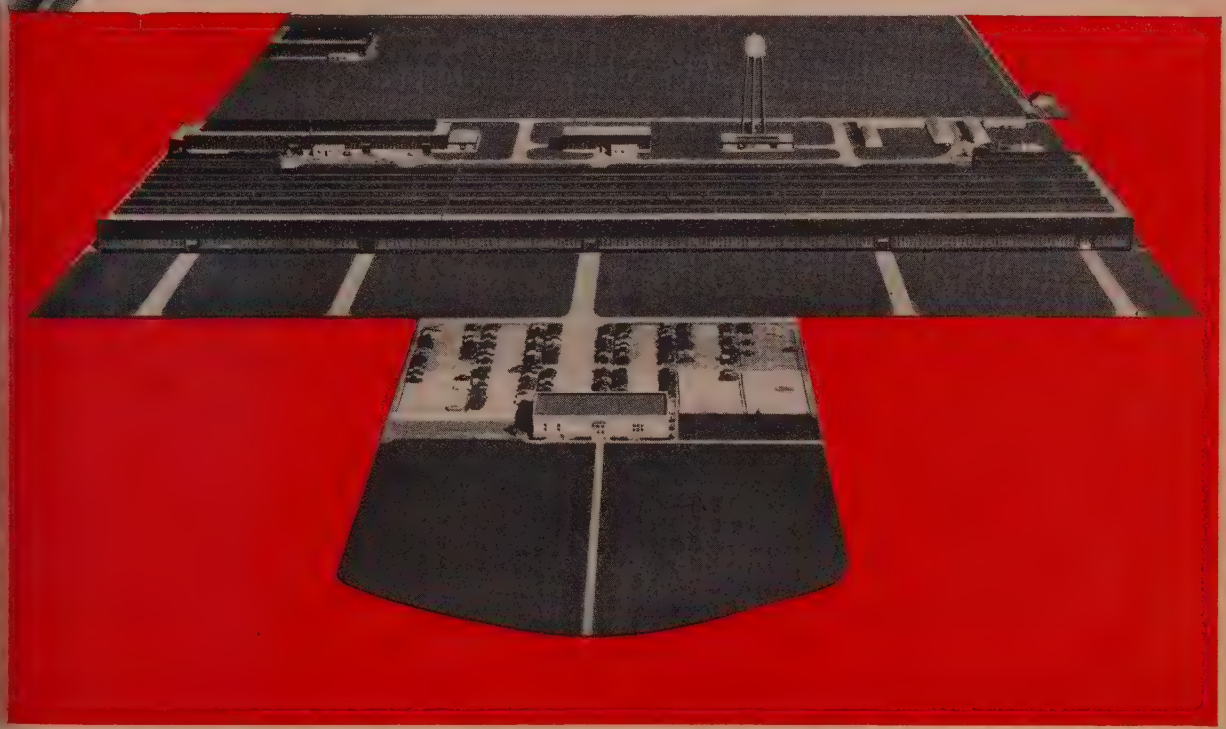
Because it places such great stress on customer service Wolverine also operates a large, newly-modernized plant in Detroit, Michigan, as well as maintaining a nation-wide network of sales offices and mill depots.

In addition to the production of highest quality tubing Wolverine's Decatur plant is also equipped to provide customers with complete fabrication services.

Wolverine Sales and Technical Representatives are fully-trained specialists capable, and anxious to provide competent guidance in the use of tubing for all kinds of applications.

So remember—East, West, North and South—wherever your company may be located you are as close as your telephone to Wolverine's top quality tubing, extruded shapes and service. May we hear from you soon?

***The Other One? Wolverine's newly-modernized Detroit plant.**



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medium-price car dealers. So, while De Soto-Plymouth and Chrysler-Imperial-Plymouth dealers will have the 108-inch wheelbase Valiant, Dodge will have the 118 inch wheelbase Dart — a Plymouth in Dodge clothing — in three series priced to compete with Ford and Chevvie. Ford will have the 109-inch Falcon, but the Edsel will also be made in a 113-inch version for Edsel Mercury and Lincoln dealers. Corvair is the name of the new rear-engine (aluminum) 108-inch compact car for Chevvie and Chevvie-Olds dealers. But there will also be a somewhat longer wheelbase "compact" car presumably for the Pontiac and Buick dealers. One wonders whether GM will eventually revive the baby Cadillac (La Salle) idea for its premium car dealers. It all adds up to a confusion for the future car buyer but our hunch is that its eventual solution will mean smaller, lighter cars — but at not greatly reduced prices. Maybe this is the beginning of the end of the American Juggernaut.

Danger, Fiberglas » » The recent combination of Johns-Manville with Libby-Owens-Ford underscores the threat of fiberglas as a competitive material for aluminum. Fiberglas has already made an impression in the small boat and transportation industries — often at aluminum's expense — and is tackling other areas where aluminum hopes to establish pre-eminence. Example: In the home building field, fiberglas is being promoted strongly for siding, patio roof panels and home insulation. The merger of Libby-Owens and Johns-Manville gives fiberglas products marketing a tremendous boost; backs this up with combined research facilities. This does not imply that the aluminum industry is unequal to the challenge, but it is obvious that the entire plastics industry will give aluminum some of the toughest competition it has ever had.

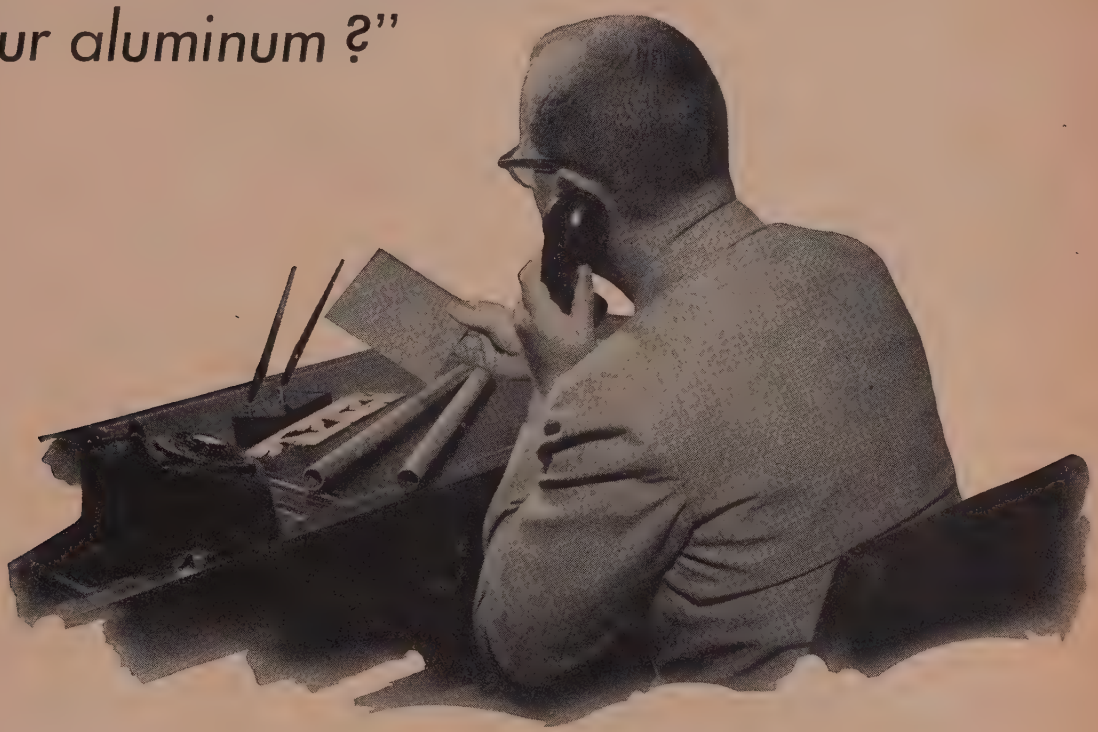
Hello Again, Draft Beer! » » Word is that Reynolds Metals Co. is perfecting a fully automatic aluminum container for home dispensing draft beer, carbonated soft drinks, milk and other beverages in case quantities. The inventor is John H. Bull of Chicago. A Reynolds spokesman reported that the brewing industry is studying the feasibility of the container named "Tapper" by Reynolds, as a "take-home" dispenser for genuine draft beer. In appliance-happy America this could be a whale of a seller!

From Beer To Baby Foods » » William C. Stolk president of American Can Co., has indicated that his company is exploring aluminum's possibilities as a can material for baby foods. The light metal could have particular appeal to mothers. Baby foods, mild as they usually are, might not be subject to problems of interior corrosion and staining experienced by other aluminum packaged foods. Stolk added that American Can plans to introduce soon a new type of aluminum aerosol can.

Record Aluminum Output » » The primary aluminum producers turned out a record 167,323 tons of the light metal in June. This total topped the previous record of 163,875 tons, produced in May of this year, and was well above the 115,325 tons turned out in June, 1958. It shows what they can do now when pushed.

Integrated Service IS OUR BEST SALESMAN

"*Why sure you can change your delivery date, Bill. How soon do you want your aluminum ?*"



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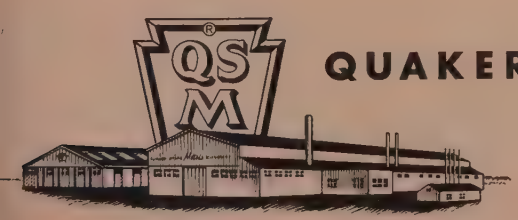
But flexibility is not the only advantage you get from QSM's integrated plant. Your deliveries are more reliable; quality control is more precise; orders are completed faster; and there's less red tape to annoy you. So next time you order aluminum, think of Quaker State's *integrated plant*.



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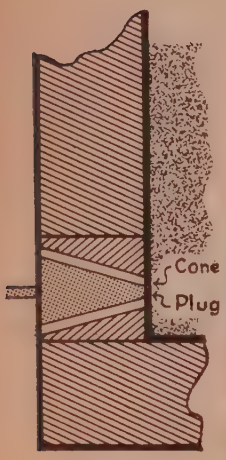
We also manufacture special shapes to order — tubes, floats, etc. This material is not wet by aluminum.



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New Enterprise

A new manufacturer of **aluminum shingles** is U. S. Aluminum Siding Corp., Franklin Park, Illinois. The 4-side interlocking roofing shingles are said to be hurricane proof and do not require painting or cementing down. Only one nail per shingle is required.

Zero Manufacturing Co., Burbank, Calif. recently bought the stock of White Aircraft Corp., Palmer, Mass. Zero manufactures **metal containers** for electronic and missile firms; White produces electronic enclosures and carrying cases. White Aircraft, a fabricator of magnesium ladders during the '40's, ran into financial difficulties and apparently switched to military contracting.

Aluminium Ltd. Sales, Inc. has opened a resident **sales office** at 10 S. Brentwood Blvd., St. Louis, Mo., managed by Robert H. T. Dodson. "This opening is one more step in bringing our operations closer to our customers," president Eric West said.

A complete line of aluminum and steel **truck dump bodies** and trailer dumps is manufactured by the Lodestar Corp., Niles, Ohio. L. J. Tripodi is president of the firm.

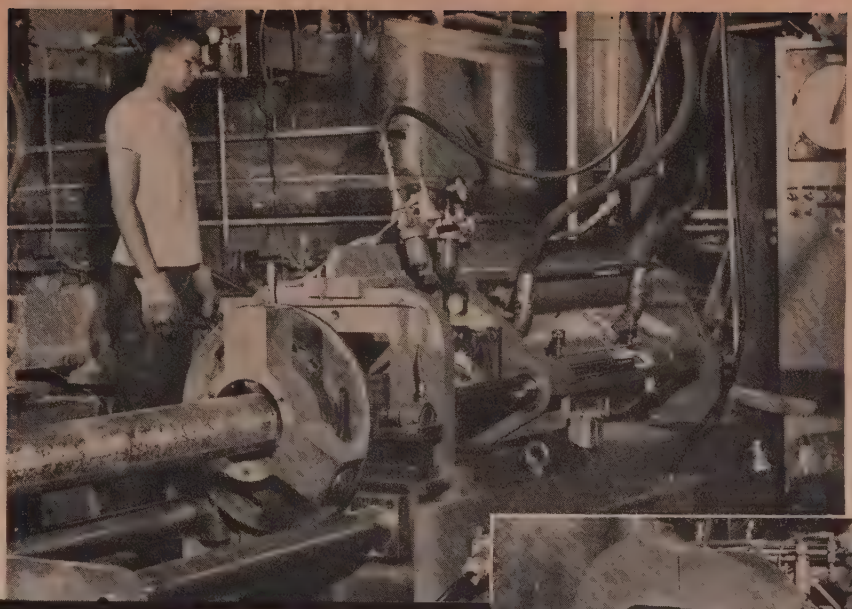
Bakery equipment has been added to the extensive product line of Read Standard Division of Capitol Products Corp., York, Pa. Capitol is a large manufacturer of aluminum doors. Read Standard, which was acquired by Capitol last year, also makes marine and structural products, and recently introduced a line of aluminum street and highway lighting standards.

The Airdome **roof louver** has been added to the line of aluminum all-weather louvers made by N. H. Rudeen Co., Inc., 2940 Girard Ave., So., Minneapolis 8, Minn. "A large, three-way opening permits greater free air flow," says the manufacturer.

In an effort to separate its non-structural magnesium products from its structural line, The Dow Chemical Co., Midland, Mich., has formed an electrochemical and chemical sales group. This department will be responsible for the sale of **extruded magnesium anodes** for water heaters and other cathodic protection operations; extrusions and strip for magnesium batteries and related products. The manager is Robert L. Featherly.

Sliding doors of aluminum and glass **bathtub enclosure** slide open and pivot to provide complete accessibility to the tub. Keystone Shower Door Co., Southampton, Pa., makes the units in standard and special sizes.

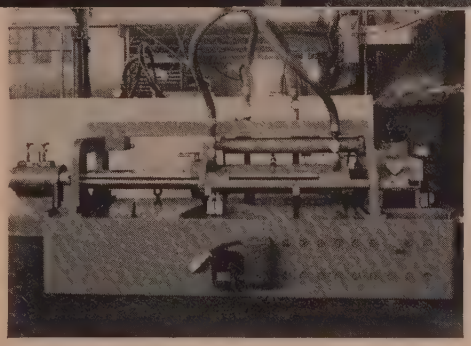
Centrifugal power **ventilators** are made by Carnes



Solidified billet as it leaves the cooling sleeve in continuous caster. Hydraulic transport mechanism moves billet as it cools.

Hunter Continuous Billet Caster

solves slug requirements for aluminum extrusions and forgings



Slugs are cut to length, by saw unit which is integrated with caster.

Close-up view of Hunter casting machine ready for shipment.

The Hunter continuous billet caster accepts molten aluminum direct from the furnace, cools it in a water-jacketed sleeve and ejects billets of controlled length which are cut off by an automatic saw. The process was originally developed to supply high quality billets for our own cold extrusion operation where D.C. cast billets just weren't good enough.

Tests indicate the superior billet produced by this unit has advantages in hot extrusion production and as a source of sound slugs for hot or cold forging.

The lower investment cost per unit will make this billet caster of special interest to independent extruders operating one or two presses. The billets are solid and dense, free of inclusions or gas pockets, and are cut to desired length as part of the machine cycle—ready for your press. Some homogenizing effect is obtained due to the slow cooling which is characteristic of the process.

The Hunter billet casting machine is *only one of several continuous casting methods* designed and built by Hunter Engineering for more efficient production of extrusions and strip stock. It is typical of Hunter's approach to new and improved methods and equipment for producing quality materials at lower cost.

Perhaps our unusual experience in aluminum fabrication techniques and equipment design can open new profit possibilities in your operations. Contact our engineering department for an analysis!

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Corp., Verona, Wisc. with spun aluminum housing. The Model DI comes in sizes from 7 to 13 inches; capacities from 125 to 2,040 cfm.

One of the fastest growing distributors of **aluminum** and other metals is Earle M. Jorgenson Co., Los Angeles 54. The firm recently opened a new warehouse in Wichita, Kan.; now operates nine metal service centers in California, Texas, Oklahoma, and Kansas. Jorgenson has immediate plans to open new plants in Phoenix, Denver, and Seattle.

The "Quik-Pik" made by Rowco Mfg. Co., 84 Emerald, Keene, N. H., helps gardener pick up debris without bending. The 38-in. handle is drawn **aluminum tube.** Twelve spearlike fingers pick up waste, spring release ejects it.

Aluminum louver shutter for the do-it-yourself market is made by Special Products Div., Modern Materials Corp., 7018 South St., Detroit 17. The size (16 in. wide by 59 in. long) is easily adjusted to window dimensions.

Hexcel Products, Inc., Berkeley, Calif., has acquired from the Honeycomb Div. of Young Spring & Wire Co., the latter's equipment for the production of **aluminum honeycomb.** Hexcel intends to move this equipment along with certain other assets of Young to its Berkeley plant.

"Sports Liner" covers for Chevrolet's El Camino pickup truck are manufactured by Aeromotive Metal Products, Seattle, Wash., San Jose, Calif., Greeley, Colo., and Evansville, Ind. The **pick-up covers** are made of aluminum sheet, weigh 69 pounds, and are equipped with a windowed rear door. Side windows are optional. These pick-up covers are gaining in popularity for sporting activities and vacationing.

One firm that is doing something about the high cost of precision inspection tooling for automotive and aircraft firms is Norton Equipment Co., 1909 Maple, Detroit 7. The firm makes **cast magnesium angle plates** of great accuracy — .0002 T.I.R. — as well as magnesium height blocks, parallel and angle plate extensions, and magnesium scribers.

An aluminum **overhead garage door** that's half the weight of a wooden model of the same size is made by Weather-Seal, Inc., Barberton, Ohio. Extrusions are used in the frame and cross stiles. The panels are diamond-pattern embossed sheet aluminum, decorated to harmonize with any home design. The doors are made in all standard garage sizes.

Another distributor that is expanding its aluminum division at a fast rate is Joseph T. Ryerson & Son, Inc., Chicago. The firm has added a **complete line of aluminum** at its Los Angeles plant for distribution in Southern California. Products include aluminum rod, bar, sheet, plate, structurals, and pipe. Ryerson plans to handle aluminum building products, as well.

Completely controlled production provides you with die cast metals of highest purity and uniformity. Federated Di-Metal is made from special high grade zinc, electrolytically refined by Asarco-developed processes. Production is now concentrated "under one roof" at Corpus Christi, Texas, one of the world's largest plants producing special high grade zinc. Integrated production—controlled from mine to finished alloy—assures you of lower cost Zinc Di-Metal of the highest purity and uniformity. Federated can serve your Di-Metal needs through 22 sales offices throughout the country. There's one near you. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

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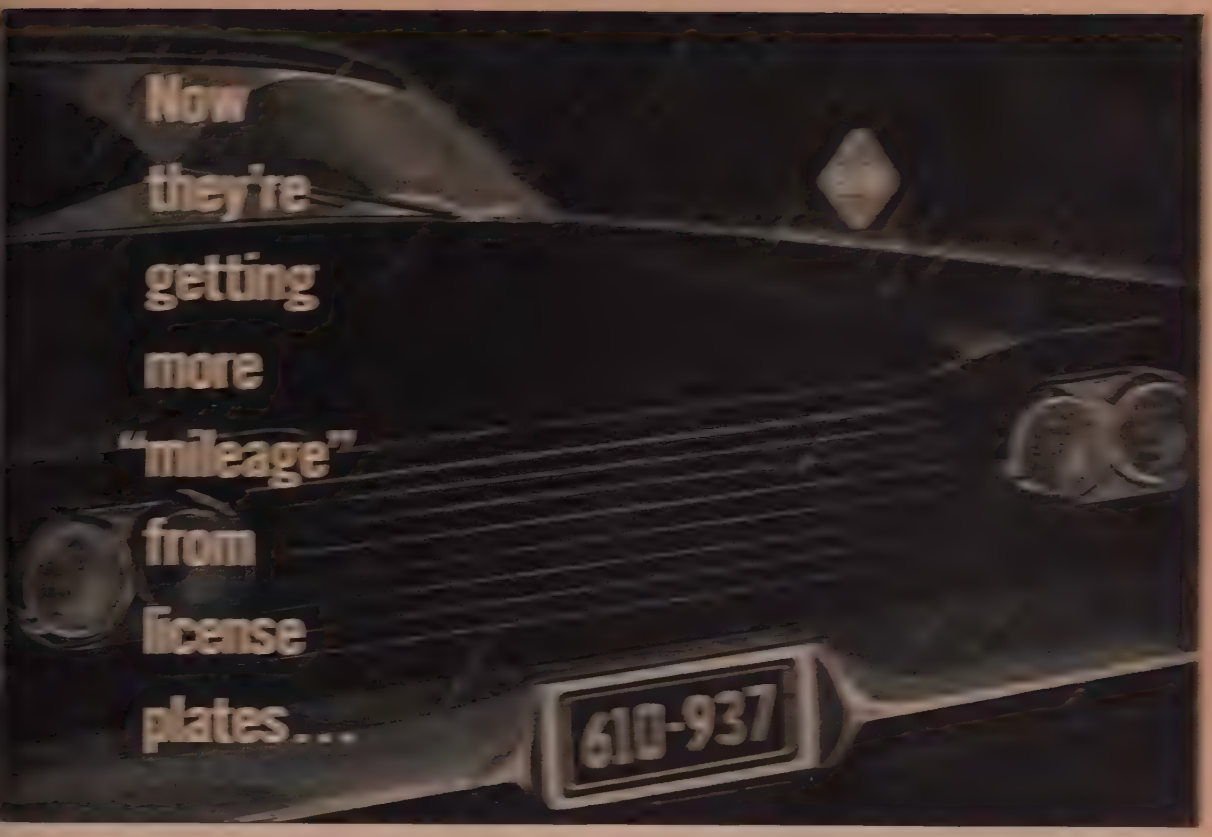

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detailed discussion of many different problems concerning the finishing of aluminum and methods for taking care of these problems. Write to J. R. Gumm, Frederick Gumm Chemical Co., 538 Forest St., Kearny, N. J.

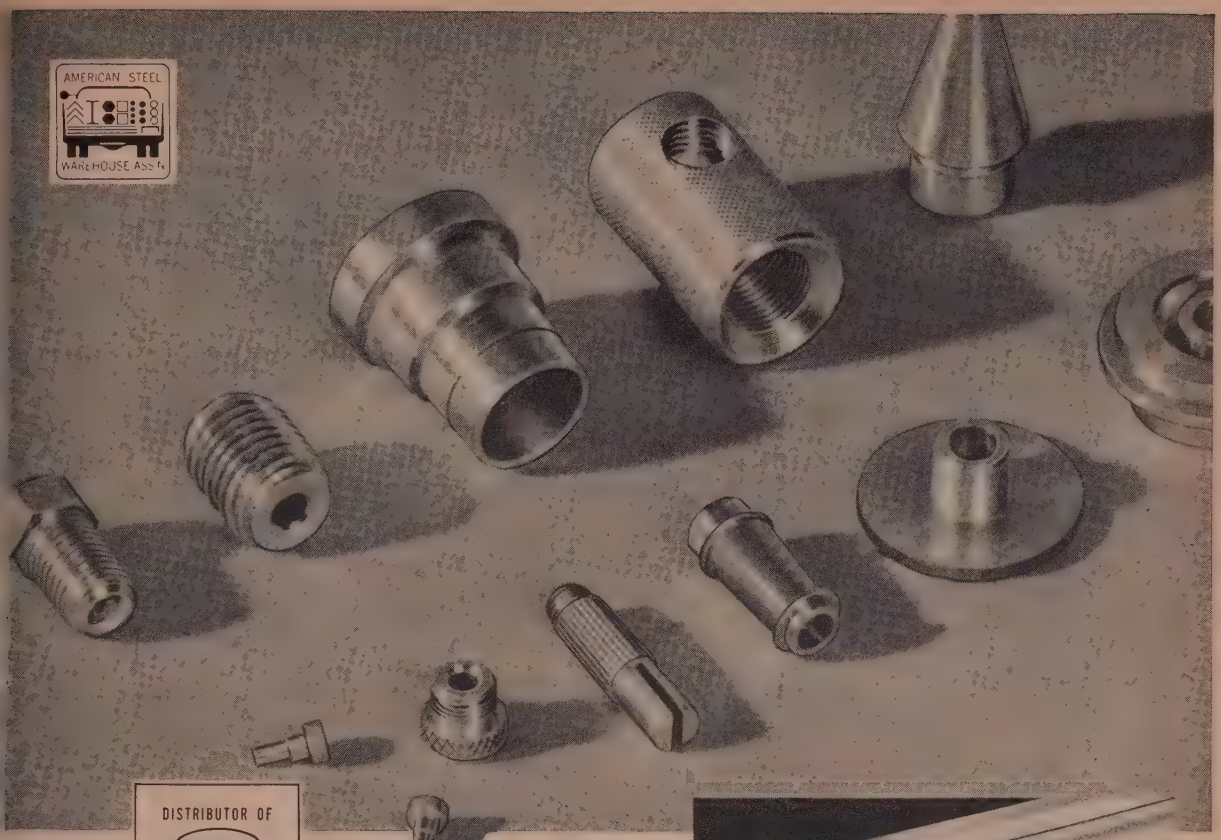
"Cost-Cutting Ideas in Rollacoating" is the title of a file of brochures and folders on the subject, prepared by Gasway Corp. The titles of the various pieces give a comprehensive picture of how Gasway Rollacoaters are applied to many types of surface finishing work for plywood and coiled and flat sheet metal: "Finishing Name Plates and Instrument Panels;" "Rollacoating in Metal Sign Manufacture;" "Automated Production of Prefinished Plywood Panels;" "Continuous Strip Rollacoating;" "Rollacoating by Gasway—The Koolvent Story;" and several others. Write to E. W. Glaeser, Gasway Corp., 6463 N. Ravenswood Ave., Chicago 26.

Electrofilm solid film lubricants are detailed in a collection of two technical bulletins and other information pieces published by Pyro Metal Finishers, division of Baker Industries. Author of the bulletins is Ralph E. Crump, chief engineer of the concern. One bulletin is titled "The Influence of Load and Speed on Wear Life of Electrofilm's Solid Film Lubricants"; the other discusses friction coefficients involved in their use. A folder in the collection details the many applications where this lubricant should be used and lists available processing charts for aluminum and aluminum alloys and for steel. Dr. Paul J. Brodeur will send this data. Address him at 10 Empire St., Newark 12, N. J.

"Latrobe Metalmasters" is a 10-page illustrated booklet telling how Latrobe Steel Co. works to produce "better tool and die steels and alloys for industry." It contains a capsuled history of the company, photos of facilities, and a list of the various kinds of steels produced. Sales office and warehouse locations are listed. Write to Robert Ferguson at Latrobe Steel, Latrobe, Pa.

Cold processed rod and screw machine stock, as produced by Olin Aluminum, is described in detail in a booklet prepared by that company. Explained are the manufacturing processes designed to provide exceptionally good density, fine grain structure and close dimensional tolerances. Alloys, size range of rounds and hexagonal shapes and typical elongation table are given for cold processed rod stocked by Olin distributors. The company's new "stak-pak" system of packing, shipping and warehouse storing this material is also described, explaining how it works to the customer's advantage. The Olin color code system of alloy identification is also given. Write to Gayle Maile, Olin Aluminum, 460 Park Ave., New York 22 for this booklet.

"Resistance Welding at Work," external house magazine of Sciaky Bros., Inc., features in its latest issue a variety of resistance welding case histories. Examples of high standard aviation and commercial welding are included. To obtain this illustrated 16-page booklet (Vol. 5, No. 5) write to W. S. Rudin, Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38.



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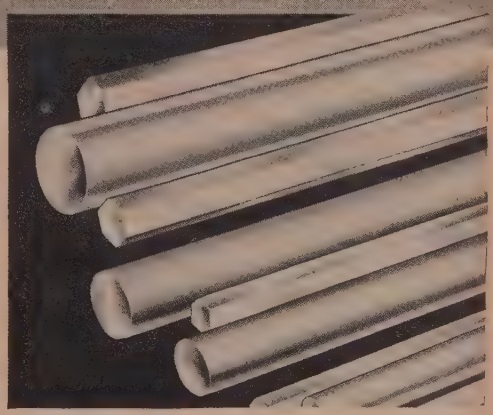

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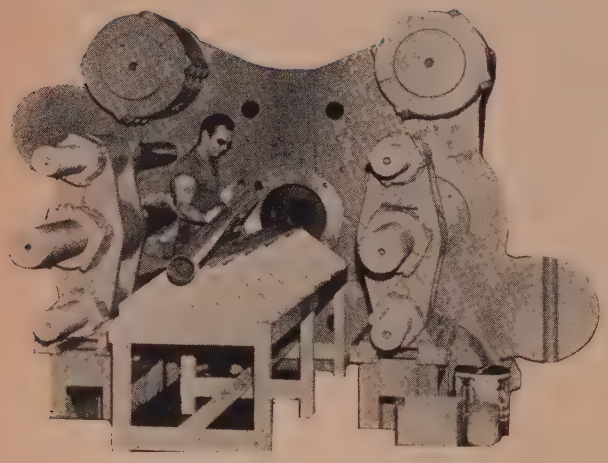
The cold extrusion of STRONG ALLOYS



The cold extrusion process, originally developed for producing complex tubular shapes in strong aluminum alloys, is also used to produce parts in costly and hard-to-work metals such as zirconium, tantalum, titanium, molybdenum, and columbium. Metal recoveries are high; surface finish is good; no cladding is needed. Technical factors are discussed in talk given at 2-day conference on Chipless Forming, held in Poznan, Poland.

by R. A. Quadt, Vice President, Research and Development, Bridgeport Brass Co.

■ *Fig. 1. Front view of a 3500-ton press specially designed by Bridgeport Brass engineers for precision cold extrusion.*

THE term "cold" extrusion, as opposed to conventional "hot" extrusion, does not necessarily refer to the relative temperature of the operation. Rather, it refers to the fact that the temperature at which deformation of the billet takes place is substantially lower than the recrystallization temperature.

In the case of aluminum and its strong alloys, the "cold" extrusion temperature is usually ambient or only sufficiently above room temperature to insure proper control of lubrication. For all the other metals discussed herein, billet temperatures range between 450°F and 1000°F, depending upon the metal or alloy, requirements of the lubricant, and configuration or tolerances.

Therefore, the final extrusions exhibit the work-hardening characteristics of increased hardness and strength, reduced ductility, and a severely distorted crystallographic structure, depending upon the extrusion ratio.

In addition to being below the recrystallization temperature, the extrusion temperature for the several reactive metals investigated is sufficiently low that no protective cladding or coating is required to prevent metal-gas reactions during the entire operation. Surface reactions with hydrogen, carbon, nitrogen, and oxygen are avoided or greatly minimized.

Other advantages of the precision cold extrusion process relate to the close dimensional tolerances possible and the higher metal recoveries as compared to hot extrusion. Wall thickness tolerances of ±0.001-inch on tubular shapes are quite feasible, while inner diameter and outer diameter tolerances of ±0.005 to ±0.010 inch are typical.

Concentricity is excellent, permitting specification of minimum wall gauge with resultant savings of weight and cost when tubular shapes of tantalum, columbium, zirconium, and other expensive metals are required.

Special Lubricants; Presses

One of the primary factors influencing the success of precision cold extrusion is lubrication. All commercial lubricants have been tried with varying degrees of success, but it has been necessary to develop an entirely separate lubrication technology for specific programs.

Different metals require specific lubricants developed or adapted to their unique chemical or metallurgical characteristics, and lubrication techniques are further influenced by the requirements of the extrusion design.

This subject is sufficiently complex to be beyond the scope of this paper and is further complicated by proprietary restrictions plus the fact that lubrication has not yet been reduced to an exact science.

The usual press equipment employed to make impact extrusions from pure aluminum and soft metal such as lead, tin and zinc consists of quick acting mechanical vertical or horizontal presses.

The work reported in this paper has been performed on 200- to 3500-ton horizontal hydraulic presses constructed specifically for precision cold extrusion of hard-to-work metals (see Fig. 1). Maximum ram deviation from the punch axis is 0.002-inch on power strokes of up to 108 inches. Ram speeds are nominal, being controllable for any advance rate up to 180 inches per minute.

There is, therefore, practically no intended impact; most cold extrusions are produced by a reasonably slow squeeze not unlike a typical hot extrusion operation. On the largest press, high strength heat treatable aluminum alloys have been cold extruded in tubular shapes up to 45 feet long, and closed end tubes up to 20 inches in diameter.

Strong Aluminum Alloys

Development work was originally concentrated on cold extrusion of the heat treatable aluminum alloys containing copper, magnesium and silicon. Heat treated properties produced typical yield strengths (0.2% permanent set) of 60,000 psi.

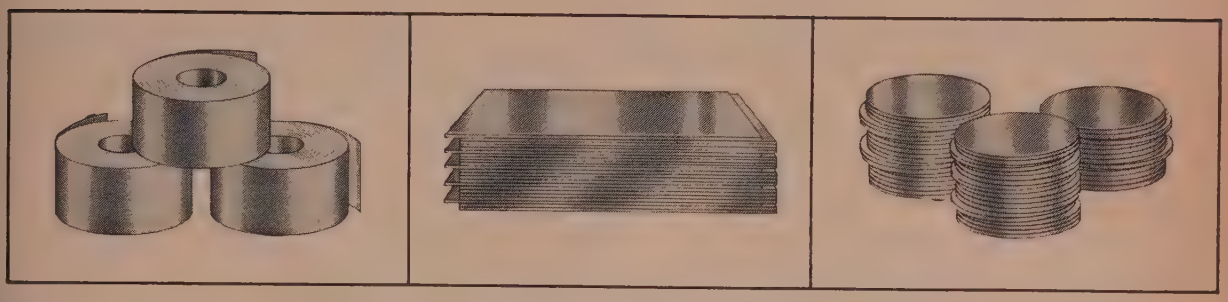
Some time later the major emphasis was switched to the more complex aluminum-zinc-magnesium-copper alloy system with typical yield strengths ranging from 70,000 to 85,000 psi. Once the tool

Table 1 — Guaranteed Properties of Strong Aluminum Alloys

Aluminum alloy (U.S.A.)	Minimum tensile strength psi	Minimum yield strength 0.2% permanent set psi	Minimum elongation in 2"
6011-T6	50,000	42,000	7%
2014-T6	65,000	55,000	7%
7075-T6	75,000	65,000	7%
*ZG73-T6	80,000	72,000	7%
*ZG92-T6	88,000	80,000	5%

*Tentative specifications

If you use aluminum sheet in any form, specify **Fairmont** to get the maximum



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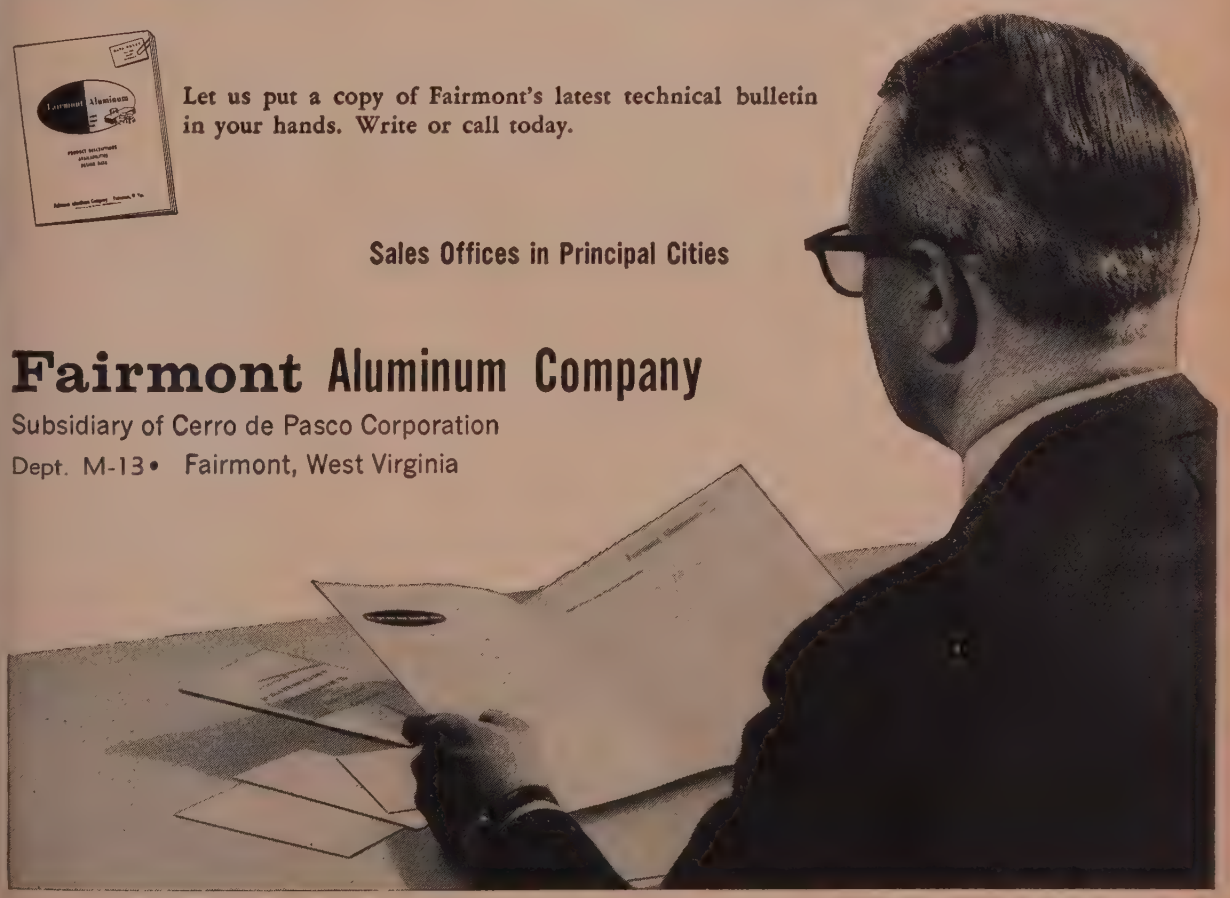

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PRECISION MAGNESIUM EXTRUSIONS (inset) form two key parts for hydraulic paper cutter.

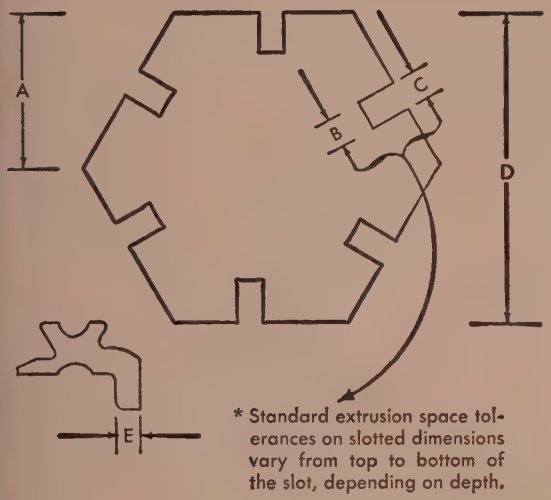
PRECISION EXTRUSIONS

tighten tolerances, cut costs

Paper cutter manufacturer slices production costs by replacing all-milled components with magnesium precision extrusions boasting tolerances as close as ± 0.0025.

Precision magnesium extrusions—a recent development of Dow's Madison, Illinois plant, deliver a big assist in the design of parts that must be extremely accurate and dimensionally stable. A wide variety of precision parts can be extruded with substantial savings in scrap loss, machining and setup time.

Harris-Seybold Company, a division of Harris Intertype Corporation, puts these advantages to work in the manufacture of hydraulic paper cutting machines. Results: six different machining and allied operations eliminated . . . machining and setup time for two key parts reduced by 64% and



* Standard extrusion space tolerances on slotted dimensions vary from top to bottom of the slot, depending on depth.

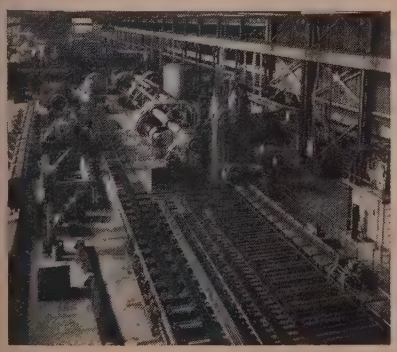
TOLERANCES HELD ON PRECISION MAGNESIUM EXTRUSIONS

Critical Dimension	Standard Extrusion Tolerance	Precision Extrusion Tolerance
A	± 0.012	± 0.0025
B*	± 0.007	+ 0.003 − 0.000
C*	± 0.012	+ 0.003 − 0.000
D	± 0.024	± 0.005
E	± 0.007	+ 0.000 − 0.003

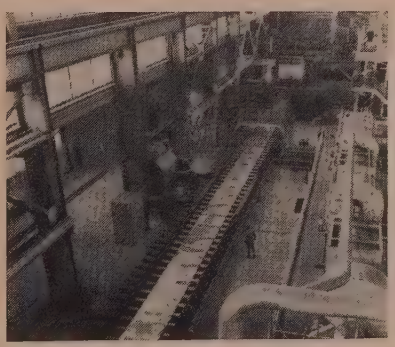
78%. Basic material costs were also lowered. The metal previously used was supplied in a high-property alloy in order to minimize warpage during the extensive machining operations. The standard magnesium alloy now used costs less. In addition, straightening operations required with the previous metal are no longer necessary.

The two parts Harris-Seybold now buys as precision magnesium extrusions serve to position the paper correctly for a number of successive cuts. They range from 46 to 106 inches in length and must be both dimensionally accurate and free of kinks and bows. No machining of these extruded parts is required after they are received in the Harris-Seybold plant.

For facts and figures about precision magnesium extrusions as they apply to your requirements, write to THE DOW METAL PRODUCTS COMPANY, Midland, Michigan, Sales Department 1341CQ8.



GIANT EXTRUSION PRESS, largest used to extrude magnesium, produces sections up to 30-inch circumscribed circle. This 13,200 ton press extrudes large structural shapes of magnesium and aluminum for aircraft and missile parts, other applications.



ROLLING MILL at Madison, Illinois is the largest in the world for magnesium alloys. Flat sheet and plate and coiled sheet are produced in a wide range of sizes. Extra flat tooling plate for all tooling uses is also produced at this plant.

HOW MAGNESIUM PRECISION EXTRUSIONS CUT SETUP AND MACHINING TIME

PART AND MATERIAL	OPERATIONS REQUIRED	TOTAL SETUP & MACHINING TIME
Spacer Bar:		*10 pieces per production run*
Previous Metal	8	1,750 minutes
Magnesium Precision Extrusion	5	626 minutes
Stop Carrier Strip:		*60 pieces per production run*
Previous Metal	8	2,399 minutes
Magnesium Precision Extrusion	5	510 minutes

OPERATIONS ELIMINATED BY MAGNESIUM PRECISION EXTRUSIONS

Spacer Bar	Stop Carrier Strip
1. Straightening	1. Straightening
2. Milling slots	2. Milling critical dimension
3. Burring slots	3. Straightening

THE DOW METAL PRODUCTS COMPANY, Midland, Michigan

A Division of The Dow Chemical Company

Table 2 — Properties of Tubes Cold Extruded From Unalloyed Titanium

	Specified Minimum Annealed Properties	Cold Extruded at 82% Reduction	Annealed 1 Hr. @ 1450°F & Air Quenched After Cold Extrusion
		99.0% Pure	
Tensile Strength	80,000	130,000	105,600
Yield Strength	70,000	115,000	79,000
% Elongation in 2"	15%	12.5%	17%
Hardness (Rockwell A Scale)	———	67.5	61
		99.2% Pure	
Tensile Strength	65,000	112,500	91,500
Yield Strength	55,000	95,000	69,900
% Elongation in 2"	20%	12%	17.5%
Hardness (Rockwell A Scale)	-------	63.5	57

ing and lubrication details were worked out, these complex alloys appeared to offer less cold extrusion difficulty than the softer non-heat treated alloys.

Table I lists some of the U.S. high strength alloys and the minimum properties guaranteed for engineering design purposes.

A relatively large and complicated precision shape extruded in one of the high strength alloys is shown in Fig. 2. The tube is about 100 inches long, has a length-to-diameter ratio of about 32:1, and has a basic wall thickness of .046-inch. Note, in the closeup of the sectioned end, the non-symmetrical distribution of metal in the periphery of the tube. In spite of this difficult distribution of metal, straightness of the tubes is held within .120-inch over their total length. The part is a rocket launcher tube.

Another point of special interest is the fine, relatively equiaxed recrystallized grain structure achieved in cold extrusions. Since many parts serve as pressure vessels, the circumferential properties are as important as those in the longitudinal direction. It has become possible to guarantee the same properties in the transverse direction as in the longitudinal, even in sensitive zinc-magnesium-copper alloys.

The surface finish of cold extrusions is excellent, generally ranging from 30 to 100 microinches, with 70 typical.

Since very precise tolerances are attained in the as-extruded condition, the only machining operations required are drilling, threading, slotting, trimming to length, and similar minor metal removing operations.

It is never necessary to remove metal by boring or turning since outside and inside diameters are produced to tolerances within normal machining standards, and eccentricity is negligible.

In Zirconium, Titanium . . .

Three grades of zirconium alloys have been precision cold extruded in large quantities: Pure reactor grade; commercial zirconium containing hafnium; and zircaloy (reactor grade Zr plus controlled amounts of tin).

Most of the precision shapes have been produced for moderator structures in nuclear reactors, nuclear fuel element cladding, or pressure vessels in nuclear reactors. A range of sizes has been produced (see Fig. 3), including many unusual shapes, both hollow and solid.

The chief reasons for cold extruding zirconium include:

1. Recoveries up to 85% from billet to final shape.
2. Sound extruded surface with good finish requiring no further machining.
3. Lower cost since no cladding and decladding are needed to prevent metal-gas reactions during processing.

Typical extrusion reductions are in the range of 80%. Using reactor grade zirconium, the cold work resulting from this degree of reduction increases tensile strength from 35,900 (annealed) to 73,000 psi; yield strength from 15,900 to 61,000 psi; and Brinell hardness (500

■ ***Fig. 2. Rocket launcher tube cold extruded in aluminum alloy. This closed end tube is approximately 100 inches long, has a length-to-diameter ratio of about 32:1, and basic wall thickness of .046-inch. Closeup of sectioned end of tube (top) shows non-symmetrical distribution of metal in periphery of the cross section. In spite of this difficult metal distribution problem, straightness of tubes is held within .120-inch over total length. Heavy external rib is later machined into dovetail joint for joining two tubes together.***

A 63S Alloy aluminum extrusion, actual size, extruded on a 14-mandrel die. Samples of this extrusion on request

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■ *Fig. 3. These Zircaloy-2 cold extrusions have an outer diameter of 3½ inches and wall thickness of .160-inch, with heavy flanges on outer diameter of their bases. Many other shapes have been cold extruded in zirconium and its alloys.*

Kg) from 101 to 150. Elongation drops from 31% to 16%.

Unalloyed titanium of several purity levels has been successfully cold extruded to tube blanks. No unusual problems were encountered, and very satisfactory tube stock was produced. The properties of the extruded tubes are shown in Table 2.

These extrusions were used as blanks for further reduction to small diameter, thin walled tubes for condensers and heat exchangers. Typical finished tubes will be ½-inch outside diameter, 0.025-inch wall thickness, and 20 feet long.

The advantages of using the cold extrusion process include improved recovery of expensive metal, excellent surface and metallurgical structure, and superior concentricity.

Development work to date on commercial titanium alloys has been relatively unsuccessful because the tool loads during cold extrusion have been excessive, resulting in tool breakage. Additional work is planned for the hard alloys of titanium.

Other Reactive Metals . . .

Tube blanks have been cold extruded at about 800°F from both arc cast and sintered molybdenum slugs. (Some typical extruded molybdenum cups and tubes are shown in Fig. 4.) Efforts to cold extrude the newer molybdenum alloys have been unsuccessful because of excessive tool loads.

Nominal quantities of unalloyed tubes have been produced with cold extrusion reductions of up to 75%. This degree of cold work increased the tensile strength from 75,000 (annealed temper) to 130,000 psi; yield strength from 50,000 to 120,000 psi; and Brinell hardness (3000 Kg) from 155 to 257. Elongation was reduced from 40% to 5%.

At present, only relatively thick walled tubes are practical for production in molybdenum. Tubes with walls of ⅛-inch or thicker, diameters from 1 to 5 inches, and lengths up to several feet are feasible.

Recent developments in nuclear power plant technology have created a substantial need for thin walled tubes of columbium and tantalum. These materials work very readily by normal cold tube reducing and drawing processes, but there is the problem of obtaining economical tube blanks. Cold extrusion has proven most successful in economically producing precision blanks.

Extremely coarse grained cast slugs melted by new electron beam furnaces have been successfully extruded with resultant excellent surfaces and fine grained structures.

The cold extrusion process produced columbium tube blanks with a tensile strength of 64,400 psi, compared with 39,400 psi in annealed wrought bar stock. Yield strength was 62,200 psi (24,200 psi in bar stock), while elongation in 2 inches was 9%, compared with 49% in annealed bar stock.

In tantalum, cold extruded tube blanks exhibited a tensile strength of 100,300 psi, yield strength of 86,400 psi, and elongation (in 1-inch) of 12%.

Quite recently, tube blanks of beryllium and vanadium have been successfully cold extruded. The beryllium slugs were sintered powder compacts. They extruded well into precision tubes with excellent surfaces and properties.

Tube blanks from pure vanadium, with slugs in both the cast and forged condition, were similarly cold extruded with superior finish, tolerances, and metal recovery. After annealing, thin walled tubes for nuclear applications were readily produced.

Although a substantial amount of cold extrusion of steel has been reported in trade journals, most of it has been limited to relatively small production parts, generally of solid rather than hollow configuration.

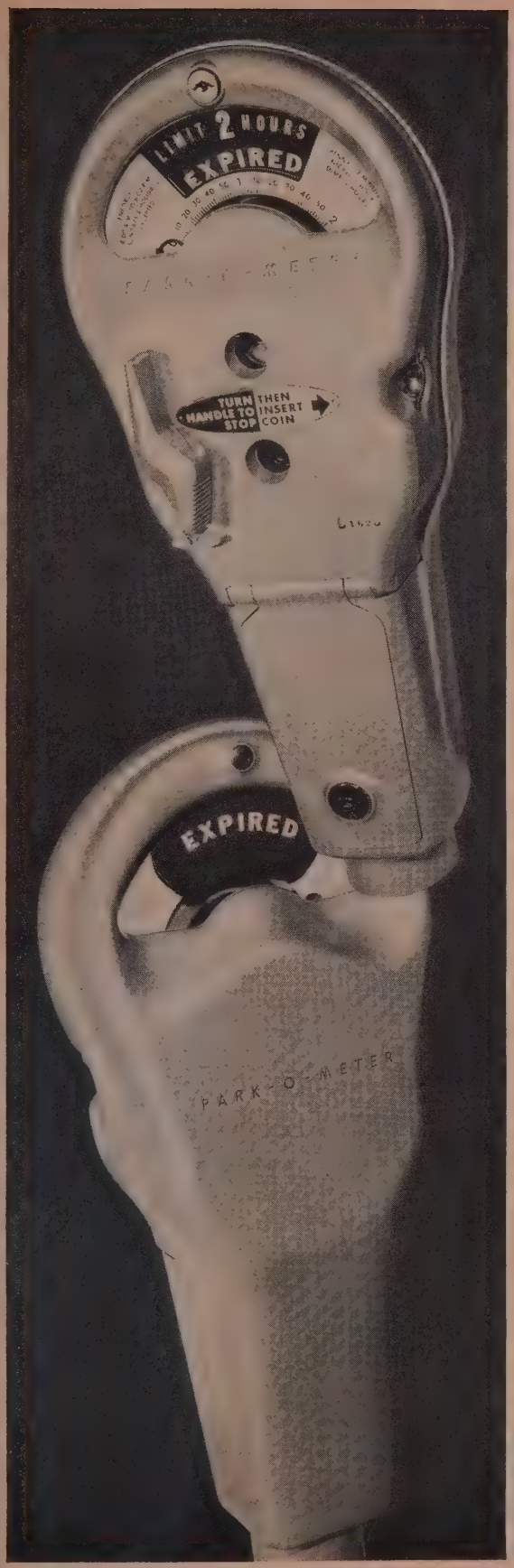
Advantages; Limitations

The cold extrusion process appears particularly desirable when (1) the metal being fabricated is expensive to produce; (2) the cost of recycling scrap is high; (3) metal-gas reactions occur at elevated temperatures; (4) precision tolerances are required; (5) cold worked non-recrystallized structures are desired; and (6) expensive machining operations can be avoided.

The process has many limitations, however, which have not been considered. Like any metalworking technique it does not have universal application. It has not proved to be a general purpose fabrication process competing in cost with castings or small machined parts that can be produced on automatic lathes by standard machining practices.

Each component must be analyzed on the basis of its own requirements and then finally accepted or rejected for production by cold extrusion.

■ *Fig. 4. Unalloyed molybdenum cups and tubes produced by cold extrusion. Cold extrusion reductions of up to 75% have been achieved in molybdenum. Cold work increased tensile strength from 75,000 psi (in annealed temper) to 130,000 psi, as extruded; yield strength from 50,000 to 120,000 psi. Dark color of back extruded tubes in center and thin-walled tubes at left is due to their not being cleaned after extrusion.*



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Next breakthrough in autos?

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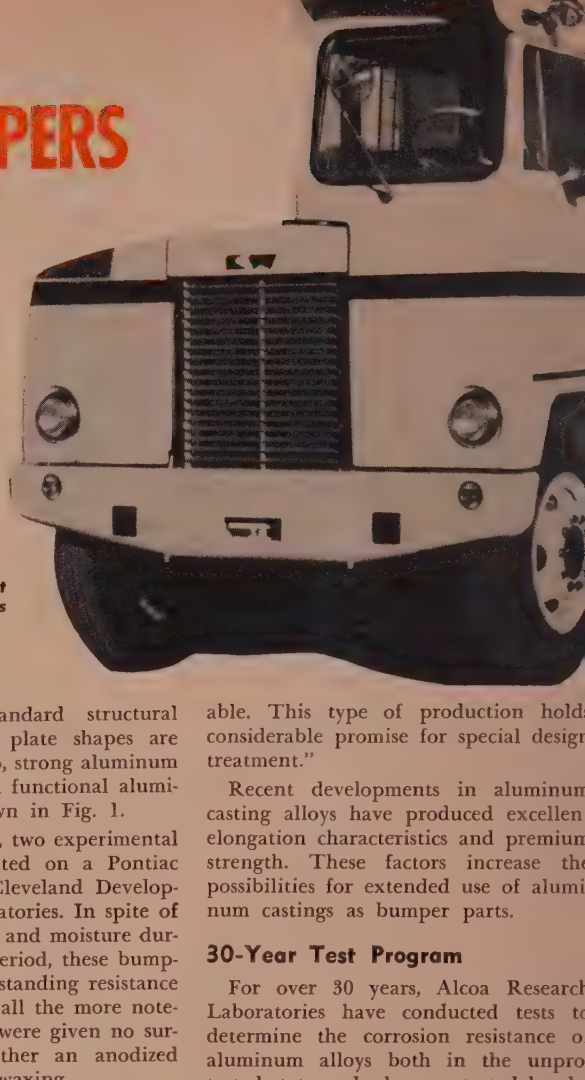
With power accessories and styling emphasis overloading the front end of today's automobile, aluminum bumpers could help lick weight distribution problems. The wide choice of fabrication, finishing and joining techniques offers broader design latitude. Test results, plus many years' experience in trucks and buses prove aluminum's serviceability in automobile bumper applications.

by E. P. White, Manager, Sales Development Division, Aluminum Co. of America, New Kensington, Pa.



■ *Fig. 1. West Coast trucks and tractors use aluminum impact bars which are strictly functional in design. Greyhound busses have been using aluminum bumpers for years.*

ALUMINUM automobile bumpers, once a curiosity, now hold much promise. To automakers they offer reduced front end weight, novel styling features, and long lasting strength. Their durability and ruggedness have already been proved by millions of miles of service during more than a decade of use on trucks and busses, while their light weight, strength and high-style appearance now present an answer to several problems.

In today's styling, front bumpers made of heavy metals can weigh from 50 to 150 pounds. Even rear bumpers may range from 40 to 50 pounds. Half of this weight or more could be saved through the use of aluminum bumpers and bumper-grille combinations.

As variations in pattern, texture, color and finish have been achieved through aluminum exterior body trim, more and more attention has been directed toward front and rear end styling. Dual headlights, new taillight formations, and greater body sculpturing offer singular styling opportunities for new grille and bumper treatments. Aluminum extrusions, forgings, castings and formed sheet offer design approaches never before thought practical.

Within its elastic limits, aluminum has more energy absorptive capacity than steel. General resistance to salt spray and road splash has proven excellent, as shown by Greyhound service across the nation.

West Coast trucks and tractors use aluminum bumpers which are standard production items. These bumpers are designed as impact bars and have no styling features. Standard structural channels or formed plate shapes are simply bolted to deep, strong aluminum frame rails. A typical functional aluminum bumper is shown in Fig. 1.

About 15 years ago, two experimental bumpers were mounted on a Pontiac test car by Alcoa's Cleveland Development Division Laboratories. In spite of exposure to road salt and moisture during the 10-year test period, these bumpers demonstrated outstanding resistance to corrosion. This is all the more noteworthy because they were given no surface protection — neither an anodized coating nor regular waxing.

Today, several European cars have bare aluminum bumpers that offer excellent service for many years.

Fig. 2 shows one of a limited number of bumpers produced in aluminum on standard production tools designed for use with steel. The bumper was buffed, brightened, and anodized. This picture was taken after 2½ years' exposure to all types of weather, industrial atmosphere, and road salt.

Aluminum bumpers and bumper parts have proven their worth in permanent mold and die cast forms, as well as extrusions and sheet. One of the most noteworthy of these applications is found in the permanent mold cast bumper end shown in Fig. 3. Regarding a similar application, one leading car manufacturer made the following statement as early as 1952:

"The processing scrap was extremely low and the reports covering plating and strength considerations were favorable. This type of production holds considerable promise for special design treatment."

Recent developments in aluminum casting alloys have produced excellent elongation characteristics and premium strength. These factors increase the possibilities for extended use of aluminum castings as bumper parts.

30-Year Test Program

For over 30 years, Alcoa Research Laboratories have conducted tests to determine the corrosion resistance of aluminum alloys both in the unprotected state and when protected by the large variety of finishes available. These tests include exposure to conventional salt spray, alternate immersion, humidity cabinet, the seacoast atmosphere at Point Judith, R. I., and the industrial atmosphere at New Kensington, Pa. Corrosion resistance is evaluated in terms of appearance, depth of penetration, and change in tensile strength.

Maintenance of appearance is the most important requirement for automobile trim. Data are available showing the performance of anodically coated aluminum after exposure during seven years and longer in various environments.

One test is particularly significant. Samples of 5052 alloy with .10, .20 and .30 mil thickness anodic coatings were exposed for six months to 20% continuous salt spray at 95° F. While all samples remained in relatively good condition, the samples with the .10 mil coatings were not quite as good as those

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■ *Fig. 2. One of a limited number of aluminum bumpers which were produced on standard production tools for steel. This bumper was buffed, brightened and anodized, and looks pretty good after 2½ years' service.*

with .20 and .30 mil coatings.

In all cases, the appearance and corrosion resistance of anodized samples after exposure to various environments improve with increased thickness of the coating. Thus, it is recommended that Alumilite coatings on bumpers be not less than .15 to .20 mil thick.

Tests were also conducted on chromium plated aluminum alloys. In one program, a set of panels was exposed to 20% NaCl continuous spray at 95° F. for 740 hours. A duplicate set was exposed for five years to the industrial atmosphere at New Kensington. At the conclusion of these test periods it was found that the chromium plated alloys had performed satisfactorily.

Virtually all production model cars today have aluminum grilles, moldings, scripts, emblems, medallions, and other parts. Some manufacturers have employed aluminum for wheel covers, side panels, scuff plates, license plate holders, etc. In all cases, performance has been excellent.

Easy to Keep Clean

Aluminum alloy automotive trim and bumpers require only the ordinary maintenance provided by the car owner. With any type of finish, Alumilite included, the best performance is obtained with periodic cleaning and waxing. Ordinarily, road films can be removed with water and gentle rubbing.

For films that are difficult to remove, mild soap and water are satisfactory. There are several wax-base polish cleaners which produce excellent results. Solvent cleaners such as kerosene, turpentine, or gasoline may be used to remove tar spots from anodic coatings.

In cleaning anodized aluminum surfaces strong, uninhibited alkaline cleaners should not be used. Such harsh cleaners are not necessary since the anodized surface will clean satisfactorily with mild soap and water. Such cleaners may also harm the lacquer or enamel finish on the modern passenger car.

Inhibited alkaline cleaners are available if such drastic steps are needed to remove stubborn road films caked on by months of driving without a wash.

Three Design Objectives

From an engineering standpoint, there are three principal considerations for bumper design: The bumper must resist local denting (low speed impacts and stones should not cause local buckling); overall strength must be good (pushing and jacking requirements dictate metal thicknesses and distribution for overall strength); and the first two requirements must be achieved at the least possible weight.

Because of aluminum's light weight, gauge increases can be tolerated while at the same time significantly reducing weight. Thus, aluminum bumpers can be designed to give deflection characteristics and overall strengths equivalent to or better than those of similar steel bumpers.

Because of aluminum's lower modulus of elasticity, the aluminum bumper will absorb nearly three times as much energy, within the elastic limit, as its mild steel counterpart. Even when compared with the modified high tensile "bumper" steel, aluminum would absorb 65% more energy.

These figures are determined through the formula generally accepted for calculating total energy absorbed under bending conditions:

$$V = \frac{f^2 \; S^2 \; K}{EI}$$

where V = Total energy absorbed, in-lbs.
f = Fiber stress, psi.
S = Section modulus, In^3.
E = Modulus of elasticity, psi.
I = Moment of inertia, In^4.
K = A constant based on end conditions. (Not a factor for identical end conditions.)

If necessary, aluminum bumper sections can be reinforced or thickened. These changes are not costly and are accomplished by slightly deeper flanges, a modest metal thickness increase, or a vertical web welded in to make the curved bumper sections more stable. The extrusion process makes variations in metal thickness practical, and substantially reduces stamping die costs.

Engineers fighting weight problems can reduce front end loads with amazing ease through use of aluminum bumpers. Calculations show that an aluminum bumper weighing half as much as a similar 100-pound steel bumper could reduce the front axle load by 66¼ pounds. This is determined on the simple geometry of a car with a 40-inch overhang for the front bumper and 123-inch wheel base.

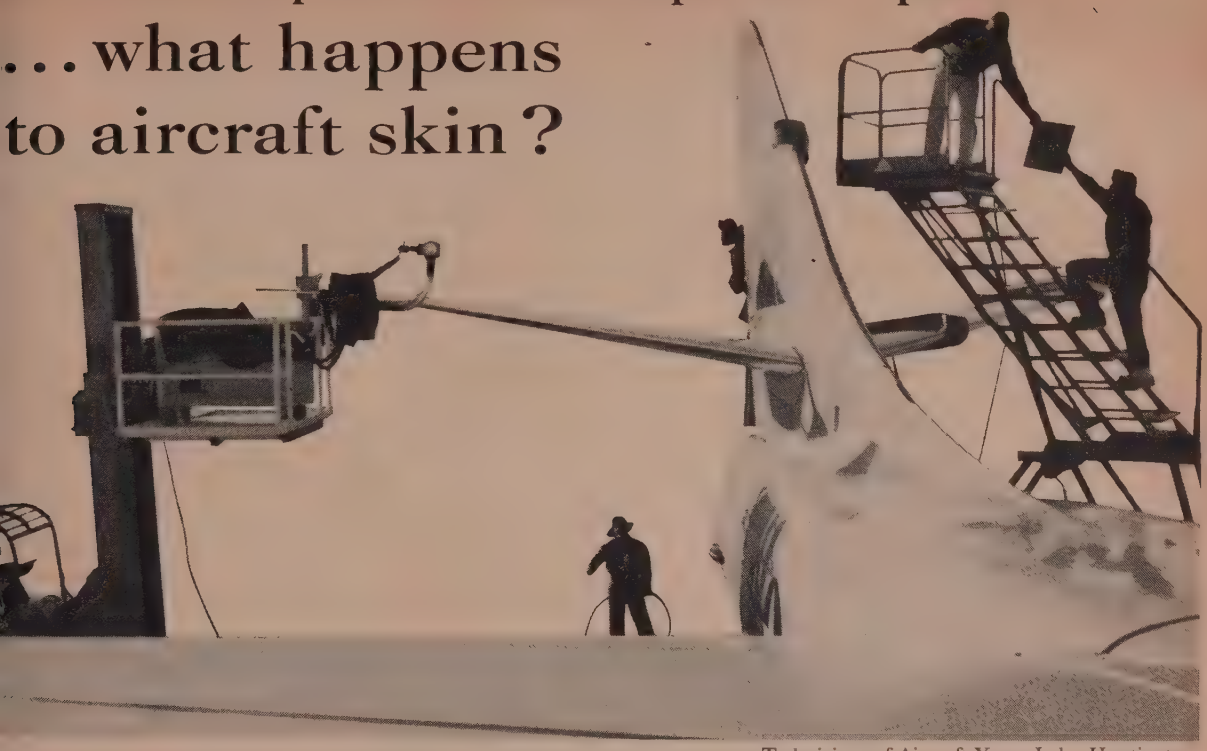
Thus, the 50-pound bumper weight reduction reduces front axle loading 16¼ pounds more than the gross weight saved. Gross vehicle weight is lowered still more with lightweight bumpers at both front and rear.

Engineering for strength must always be combined with engineering for shape and fabrication. Joining, forming and finishing must be economically accomplished to produce a pleasing bumper with high impact strength and durability.

While all fabrication methods are

■ *Fig. 3. Chrome plated cast aluminum bumper ends gave more than adequate service on several Cadillac models.*

At arctic temperatures and supersonic speeds ...what happens to aircraft skin?



Technicians of Aircraft X-ray Labs, Huntington Park, Calif., radiograph fin of aircraft at –65°F

WITH AIRCRAFT POWER mounting, with speeds that leave sound behind, extremely high frequency vibrations were bound to build up. What would be their effect on aircraft structures—at temperatures ranging to 65°F below zero? To find out, radiography and Kodak Industrial X-ray Film, Type AA, were put to work.

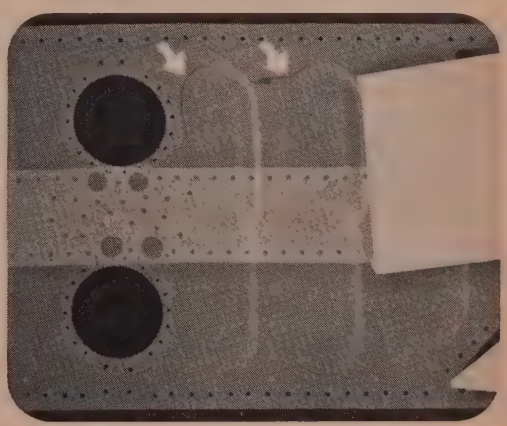
The radiographs revealed fatigue failures and gave clues to the nature of the stresses.

Exposures were made at target distances from 5′ to 15′ with exposures from 40 sec. to 90 sec. In spite of the cold, the film received no special handling.

All of which shows the importance of radiography as a test—also the dependability and versatility of Type AA Film.

If you build intricate assemblies, make castings or produce welded products, radiography can provide inside information as nothing else can. It can save time and money—improve foundry production and welding operations.

If you would like to know how it can help you, discuss it with your Kodak x-ray dealer—or with the Kodak Technical representative.



Radiograph reveals evidence of material fatigue under stress.

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possible with aluminum, both special advantages and limiting factors must be recognized. To list the advantages:

1. The same tools can be used on aluminum as are used on steel for a large majority of formed sheet impact bars, bumper ends and accessory parts.

2. Extrusions can be made in almost unlimited forms and contours.

3. Properly designed extrusions can be press forged for special medallions or contours.

4. Stretch, tension and contour forming equipment is available to handle special forming work.

5. Special alloys and metallurgical treatments offer unique finish and appearance qualities for anodic coatings.

6. New surface treatments can be incorporated into forming equipment to impart new finishes or textures with standard forming operations.

7. Special forms are available in permanent mold and die castings where wrought alloys cannot economically produce a desired part.

Here are some special considerations:

1. Welding can be considered for attachment of mounting brackets, but arc welds should not be located at high stress locations because of the local annealing effect.

2. Since arc weld fillets are noticeable with an Alumilite finish, welds should be kept away from the exposed surface of the bumper or must be in areas readily hidden.

3. Hot forming requires special considerations in regard to final temper.

4. Springback and other drawing characteristics of aluminum are slightly different from those of steel. Therefore, production tooling for steel bumpers is not always suitable for aluminum.

Big Choice of Finishes

Finish variations for aluminum bumpers are nearly limitless. Aluminum accepts chemical etches, mechanical texturing, bright polish and luster—with or without color. These treatments assure long life through the Alumilite coating—a protection not available for other materials. Soft muted tones can be achieved with chemical etchants or a variety of sand blast, grit blast, vapor blast, scratch brush, abrasive belt, etc.

Bright sparkle can be created with chemical and electrochemical brightening treatments, as well as with standard buff, polish and highlight techniques.

Certain Alumilite colors are fade resistant. These colors can be combined with enamels, dye stop-off and metal highlights to achieve styling techniques never before possible. Thus, complementary bumper styling offers rich bronze or a light, gold-like oxidized nickel appearance with contrasting near white etch in selected depressions.

Chrome plating also offers unique contrasts for further variation. Chrome plated bumper ends, guards and face bars have already been used in production. These points could be turned to further advantage through use as framing pieces for parking lights, etc.

Combining aluminum with other materials presents no difficulties because modern design combines all suitable materials. Neither is it prejudiced by a past history of other methods of construction. As a new basis for bumper styles, aluminum will doubtless be combined with many new materials such as colored rubber, molded nylon or other plastics (see Fig. 4).

Bonding and mechanical fastening methods are already in use to join these dissimilar materials on a production basis.

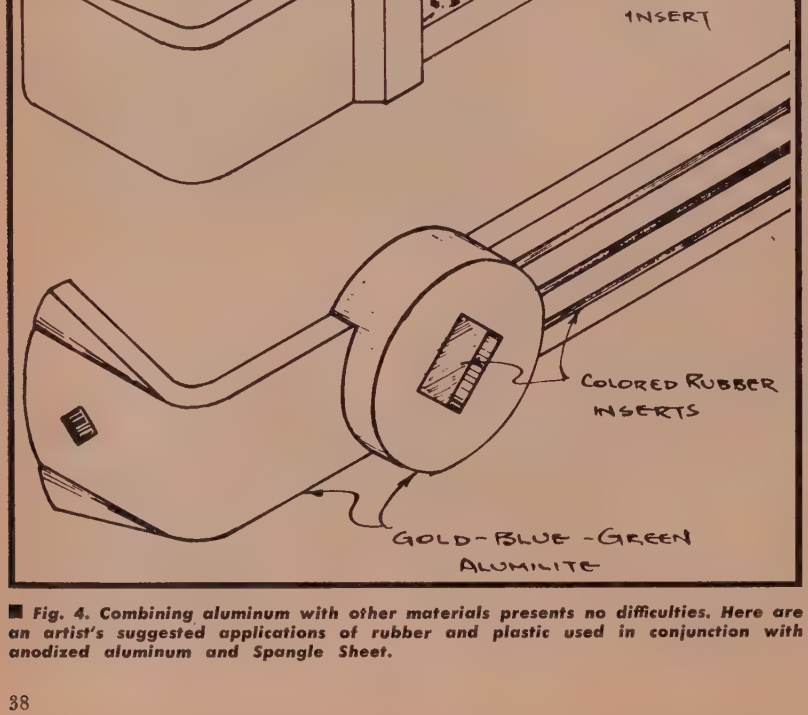
Color inserts can create style emphasis as well as wear strips to resist scratching and general light abuse. Colors of inserts and bonded "boots" can be varied with the choice of body colors. Chrome plate can be used to offer sharp contrast with an etched or color anodized aluminum surface. These features could be designed as "extras" for sale and installation by local dealers, thus giving the style conscious owner another touch of individuality.

Aluminum has a prominent place in every bumper design studio because it can be tumbled, burnished, sandblasted, scratch brushed, hammered, buffed, etched, electrobrightened, embossed, coined, stamped or textured by many methods. Environment colors are caught and reflected by anodized surfaces which have been brightened chemically or electrically.

Suitable aluminum alloys offer strength and formability, as well as appearance. New Alcoa alloy X6463 was specially developed for the proper combination of these features. With tensile strength up to 35,000 psi, plus formability and an economical price this alloy brings the luxury of high luster anodized finish out of the jewelry trade and onto the passenger car production line.

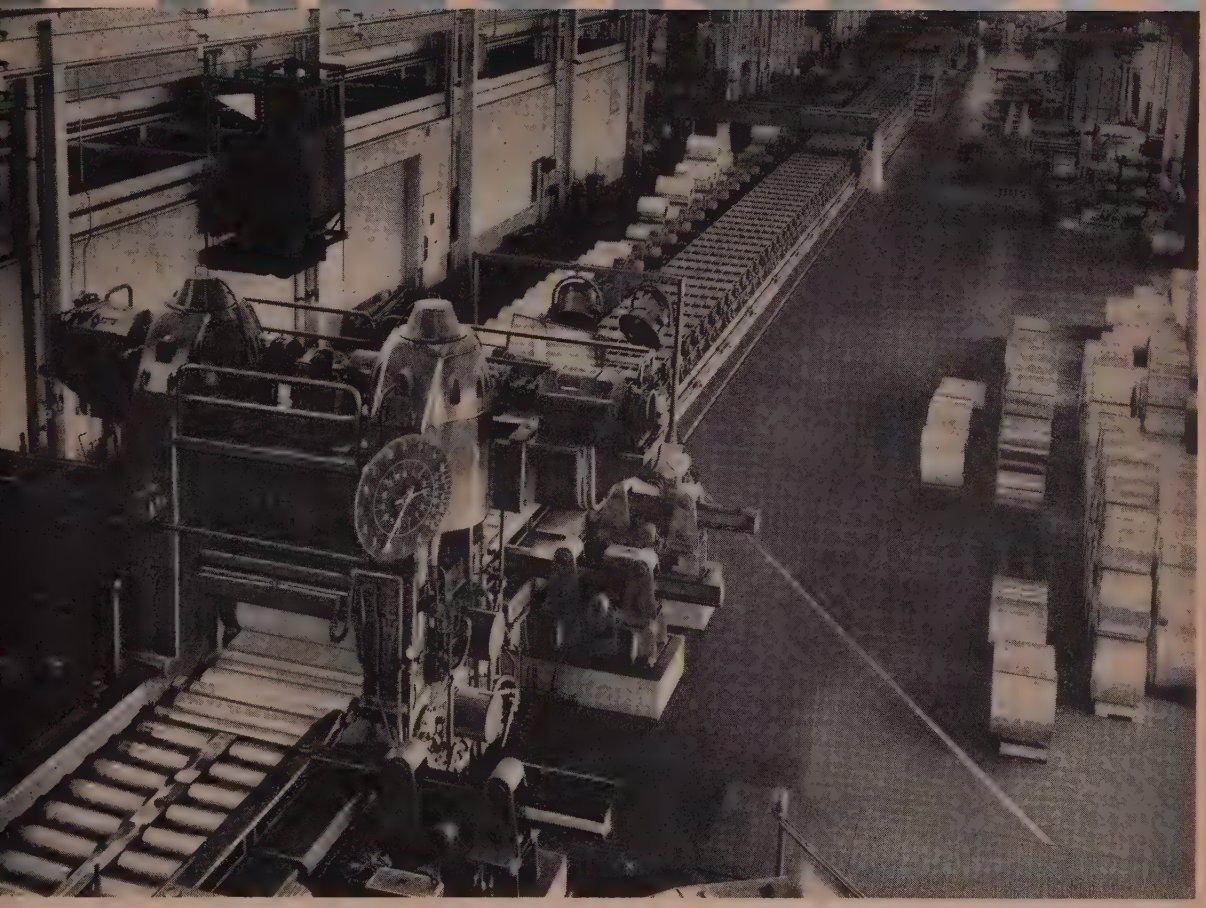
Similar high luster anodized finish products are available in sheet, such as the new Alcoa alloy X5457. In sheet products, mechanical and electrochemical finishes are also supplemented by Alcoa's new Spangle Sheet. This material offers companion brilliance to extrusions through natural metallic crystal patterns.

These and other high style features can be combined with light weight and durability to create both superior performance through light weight and increased sales through styling.



■ *Fig. 4. Combining aluminum with other materials presents no difficulties. Here are an artist's suggested applications of rubber and plastic used in conjunction with anodized aluminum and Spangle Sheet.*

PRECISION



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Positioners and planishers for

WELDING THE TOUGH ONES

Specialized equipment solves knotty problems in the joining of exotic metals, as well as aluminum, titanium, stainless, steel alloys. Positioners employ various welding processes in joining everything from .003-inch foil stock to half-inch plate. Weld planishers strengthen and smooth joints; slash welding costs.

WITH the unveiling of North American Aviation's experimental X-15 "man-in-space" aircraft, the dream of an all-welded airframe became a reality. But so rapidly have design, engineering and tooling developments been leap-frogging each other that even before the implications of the X-15 announcement were appreciated, Lockheed Aircraft Corp. had begun mass-producing entire major airframe sub-assemblies by automatic welding.

In fact, leading aircraft manufacturers are so certain that riveted planes will soon become as obsolete as reciprocating engines on intercontinental bombers that virtually all of them are now conducting extensive "crash" programs in welding research.

In the forefront of that group of engineering firms which have helped make these advances possible is a relative newcomer to the welding industry, Airline Welding and Engineering, Hawthorne, Calif. Established in 1952 by Byron R. Russell, the firm boasted 10 employees and $150,000 gross sales in its first year of operation.

Six years later Airline employs more than 100 highly skilled engineering and production personnel and is grossing more than $1,500,000 in sales.

■ *Titanium strips being welded into rings used for high temperature shrouds on exhaust ducts of jet engines. Model LW10013 may be used to weld rings up to 30 inches in diameter or cylinders up to 78 inches long.*

Airline's machines have revolutionized welding procedures in many major industries engaged in the fabrication of sheet metal. Nearly every U.S. missile fired today contains parts processed by one of the company's machines. Airline's equipment is also being used in advanced welding research by every major airframe manufacturer.

Three Types of Machines

The company designs and builds three basic types of machines: Longitudinal welding positioners; circumferential positioners; and weld planishers. Welding methods employed by these machines include tungsten inert gas (TIG), metal inert gas (MIG), submerged arc, and manual electrode processes.

The machines are capable of automatically welding nearly any metal—ferrous alloys, stainless steels, aluminum and its alloys, magnesium and its alloys (including the new magnesium-thorium materials), titanium, zirconium, the so-called exotic metals, and others. These are precision welded in any thickness from 0.003-inch foils to half-inch plate with weldment X-rays showing "water white" seams.

Pieceparts of virtually any regular configuration — cones, truncated cones, cylinders, cubes and spheres—are accepted by these machines, which utilize interchangeable mandrels.

Roll planishers are used to smooth and flatten fused welds in butt joints to aerodynamic contour, at the same time "working" the metal to relieve longitudinal and transverse stresses and create a weldment that is equal in strength and other physical properties to that of the parent metal.

Pieceparts so planished may be spun

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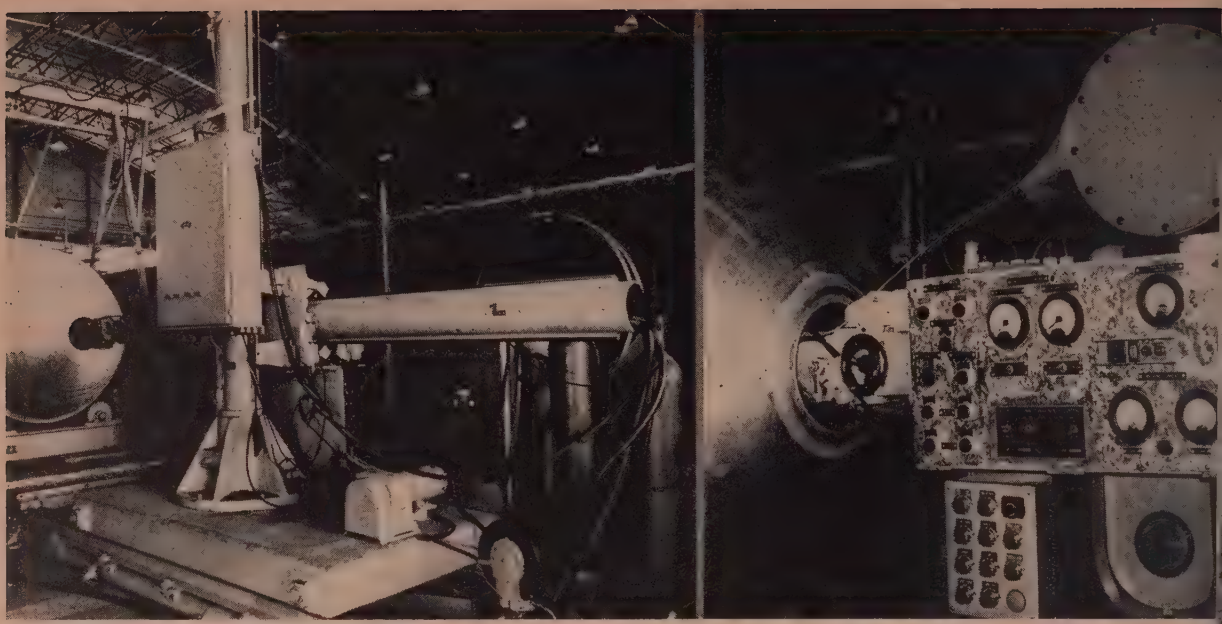


■ *Automated longitudinal and circumferential welding facility designed and built for Lockheed Aircraft by Airline Welding & Engineering. Machine was designed to accommodate nearly any type of aircraft or missile structure; will weld almost all metals to tolerances of ±0.010-inch and in thicknesses from 0.003-inch to half-inch plate. General view (left) shows machine se up to weld big aluminum hemispheres together from inside In closeup view (right), entire ram manipulator has entere shell through 10-inch port and is automatically adjusting weld ing head over weld seam.*

bulge formed or otherwise processed without microshaving, grinding, sanding or heat treating.

Airline's machines range from uncomplicated positioners designed to process simple water heater tanks to sophisticated tooling for the automatic fabrication of complicated airframe and missile assemblies.

A Tricky Inside Job

An example of the latter is the universal welding facility (shown above) designed by Airline for Lockheed Aircraft Corp. to fabricate an assembly incorporating a 54" diameter aluminum sphere with ⅜" thick walls. It is made of two hemispheres which are welded together *from the inside* through a 10-inch port (see closeup at right). Parallelism accuracy is within 0.005-inch and T.I.R. deflection is less than 0.005-inch.

By utilizing inside welding, the assembly is fabricated in less time, more efficiently, and at a considerably reduced cost. Easily applied and removed external chill shunt tooling can be used (instead of internal removable inserts required with external welding) for increased weld strength and improved geometry.

The process affords superior piecepart rigidity and positioning which, in turn, permit more accurate close-out welds.

The 288-inch long and 50¼-inch wide machine features a vertical, universally adjustable positioner incorporating a ram boom capable of full rotary and longitudinal movement. A knee action welding head manipulator arm is attached to the end of the ram. This arm is designed to microposition the welding head both pivotally and laterally. In respect to the axis of the arm, the welding head is adjustable through a 90° arc.

Other weld positioning equipment consists of a heavy duty precision headstock, idler rolls and a tailstock. The headstock is rotatable through 360°

■ *Closeup shows detail of weld joint (arrow) joining two 54-inch O.D. hemispheres made of 5/32-inch thick aluminum. Weld is made from the inside by a special machine, built for Lockheed Aircraft by Airline Welding & Engineering.*

at an infinitely variable and accurat speed between 0.010 and 2.00 rpm.

The turntable also may be powe tilted to any angle from 0° to 135° This is exceedingly important whe flanges and other off-center devices ar welded to various sections of the hem spheres.

Completely Automatic

All devices may be operated in co cert—or each independently of others by push button control. Automatic ope ation is accomplished by means of cam pre-set relay chains, time limit switch and similar controls. These are readil adjusted for other piecepart configur tions and welding requirements.

Except for the positioning of th spheres, the entire operation is aut matic. One hemisphere is affixed to th headstock and tilted 90° toward th tailstock. The other hemisphere clamped in place with chill shunt toc ing and the tailstock is positioned. Uni are then aligned and secured.

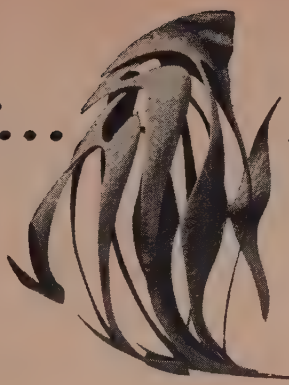
The ram, ram arm manipulator ar welding head, which were previous aligned on a horizontal plane, enter th port. At a pre-determined location, th arm lowers and the head adjusts pr cisely above the hemispherical junctio

A valve opens and inert gas pre-flo for purging. The arc strikes and th filler wire feeder starts, forming a we puddle. The positioner rotates throu 361°, completing the circumferenti weld, with a slight overlap.

(*Continued on page 44*)

THERE ARE

shapes...



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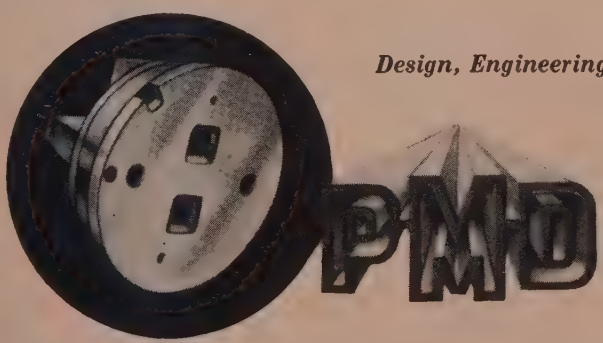

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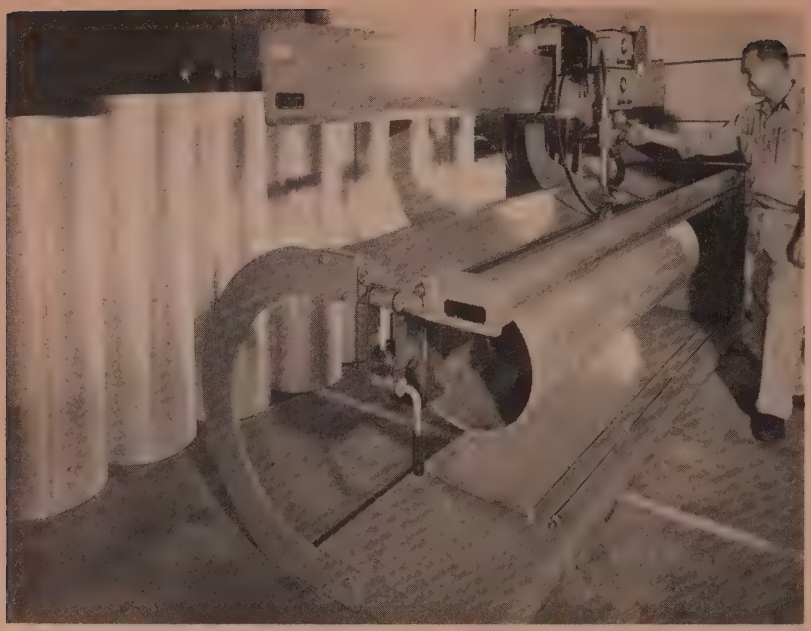


■ *Longitudinal welding positioner built for use at Airline Welding in making aluminum shells used in special type of torpedo. Model LW10020 is fitted with semi-automatic TIG arc-welding torch and electronically controlled wire feeder mounted on OM48 travel carriage. Rugged C-loop at end of machine maintains rigidity between table top and base.*

The arc then decays to a low value and shuts off, and the ram tooling reverses itself into position for the next operation.

For Simpler Jobs, Too

Although such sophisticated equipment is not required by the average metalworking plant, other equipment designed and built by Airline Welding and Engineering is finding extensive use in other industries.

Airline's positioners and roll planishers generally are engineered to perform one specific operation at a time, such as the longitudinal welding of small diameter tubing or the production welding of water heater tanks. Basis of all of the company's welding machines is a unique combination of chill shunt tooling, gripper clamping and actuating mechanisms, plus a precision welding head track.

The gripper mechanism consists of a mandrel and hold-down devices which serve two functions: To accurately align pieceparts; and to conduct welding heat away in order to prevent burning, warping and excessive distortion of the piece-parts.

Above and on each side of the mandrel are two parallel banks of level-seeking metal "fingers" (shown in closeup at right) adjustable for various shapes. Each bank of fingers operates independently of the others and are activated pneumatically by a "toe touch" fast actuating control. Pressures can be varied from 0 to 300 lbs. per lineal inch or can be increased to 600 lbs. per lineal inch with the addition of electro-hydrostatic boosters.

To position a piecepart, the metal is inserted either from the front or side of the machine (depending upon the model), aligned parallel to the offset groove, and one bank of fingers is activated. The fingers press down upon the piecepart and force it directly over the groove, and the process repeated for the other piecepart section.

Provided the piecepart has been accurately sheared, the two sections can be aligned to an accuracy of 0.001-inch. To take advantage of this precision, the positioners are fitted with supported side beam tracks with trackways machined to MU32.

Tolerances Are Tight

Carriage and welding head (TIG, MIG or submerged arc) can maintain a vertical accuracy of 0.006-inch and lateral accuracy of 0.003-inch at a welding speed range of 5 to 160 inches per minute.

Each longitudinal positioner is designed to accept an assortment of interchangeable or rotatable mandrels for welding everything from foil to heavy plate of various configurations. Copper, steel or stainless steel back-up bars are furnished with weld "drop-thru" grooves to control weld root bead, size and contour.

Many models are furnished with a plenum inert gas reservoir and inserts with orifices for uniform gas distribution along the weld. Other models employ thermostatically controlled electrical or oil heating for welding crack sensitive metals.

Titanium Rings; Aluminum Shells

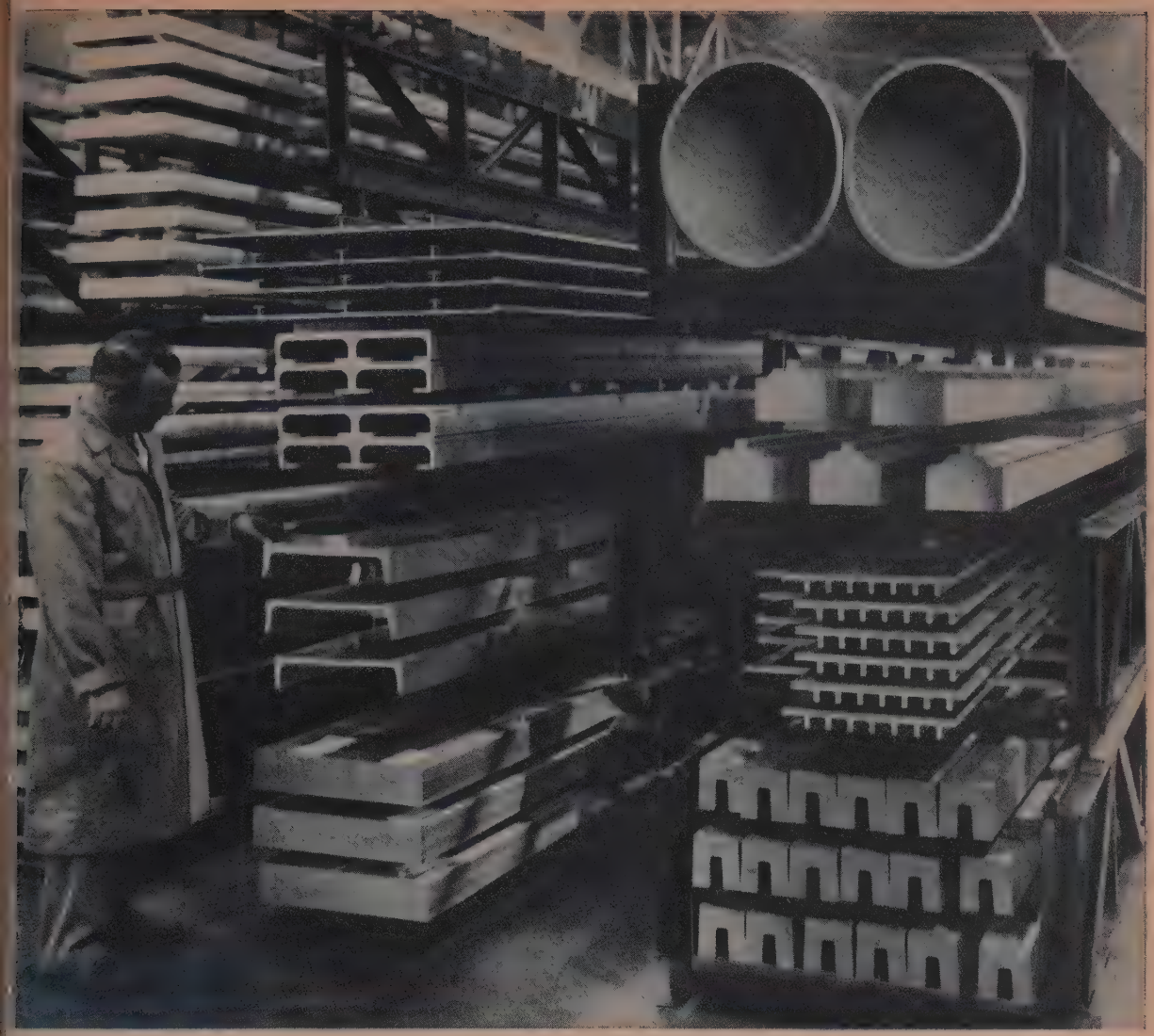
An example of a longitudinal positioner in action is the welding of titanium shroud rings on Airline's Model LW10013. Strips of .040-inch thick titanium sheet are welded into rings used for high temperature shrouds on the exhaust ducts of jet engines. Rings up to 30 inches in diameter or cylinders up to 78 inches long may be TIG welded on this model.

Another example is the precision welding of aluminum cylindrical shells which are used in a special type of torpedo. In this application, Airline uses its Model LW10020 positioner, equipped with a semi-automatic MIG arc welding torch and an electronically controlled wire feeder, both mounted on an 0M48 travel carriage which moves on a standard side beam track.

Airline's circumferential positioners are designed to operate on the same principle, utilizing circular chill shunt expanding back-up mandrels and a pressurized tailstock.

Pieceparts are first positioned by an elevator. The mandrel expands, then sizes and precisely aligns the parts. The tailstock compresses the weld joint firm-

■ *Closeup of longitudinal positioner in action shows parallel banks of hold-down fingers. Part is positioned on mandrel and both banks of fingers are activated. Fingers push two edges of part together, hold them under pressure of up to 20,000 pounds while welding head travels length of weld at speed determined by operator. Machine welds any metal from .005-inch to .050-inch thick, and up to 20 feet long.*



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reduce weight

lower assembly costs

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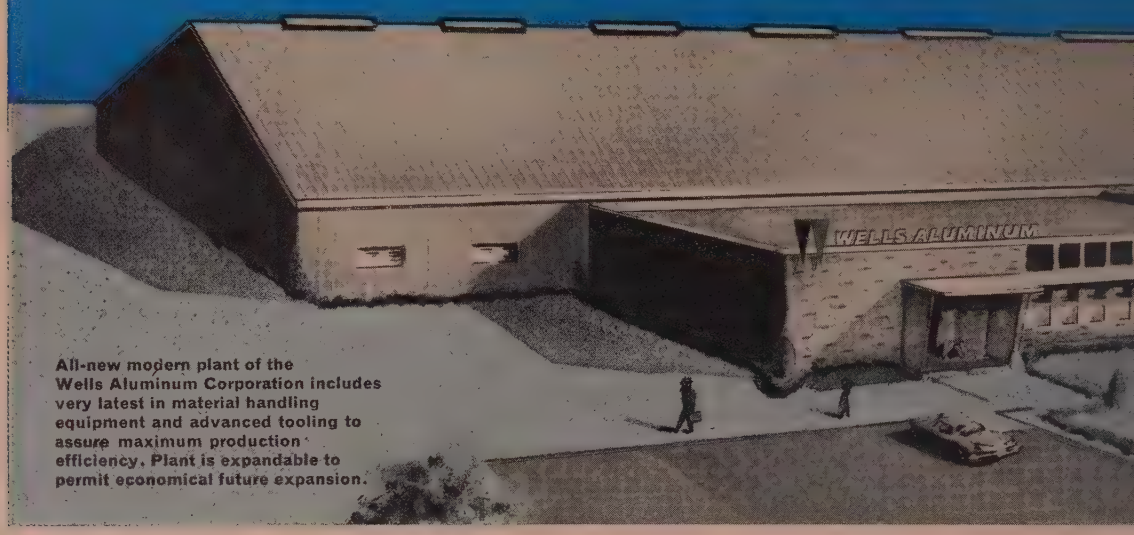

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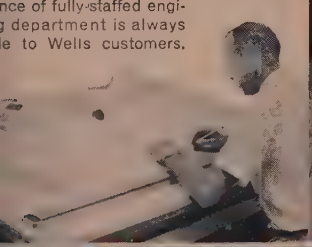

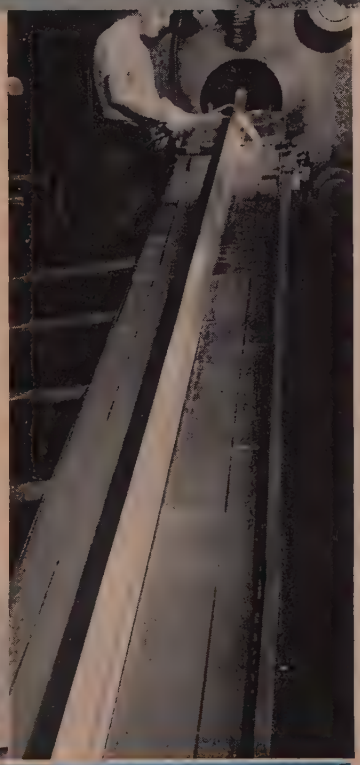

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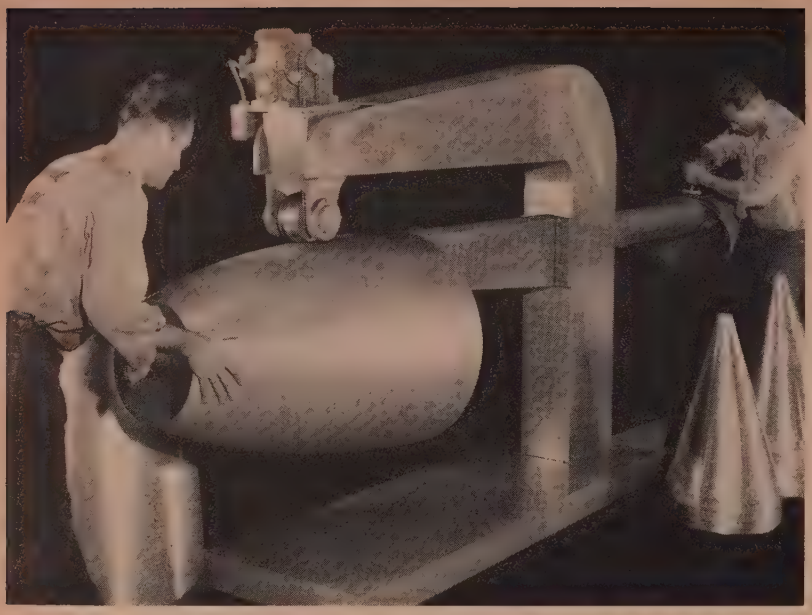

■ ***Roll planishing machine cold works and smooths welds on sheets, cylinders, cones, other shapes; increases strength of welds; eliminates grinding operations; expedites sizing, spinning, bulge forming. Shown here: Airline Welding's Model 40360. With planishing pressures up to 13,000 pounds, it will planish cylinders or cones from 11 inches I.D. to 36 inches O.D., with welds up to 60 inches long. Maximum material thickness is 1/8-inch.***

ly together. Welding, rotation of piecepart and ejection are automatic.

The final processing of the weld by roll planishing has brought the popularity of fuse butt joint welding to a new high. Inherent weaknesses in this type of weld are eliminated and cost is reduced considerably.

Both hand fed and automatic roll planishers resemble an elongated "C" with the top arm serving as a fulcrum beam (see illustration). At the end of the beam is a geared motor-driven hardened roll contoured to the shape of the piecepart and directly positioned above an idler roll.

The piecepart is placed between these and pressure of up to 20,000 lbs. is applied, the amount depending upon the requirements of the weld. The upper weld roll drives the piecepart along the axis of the weld at speeds ranging up to 200 inches per minute.

How Planishing Slashes Costs

A cost analysis comparing the welding and planishing method with the conventional procedure is shown in Table 1. This comparison involves the production of identical truncated aluminum cones that are later spun-formed.

Both cones are fabricated of 6061 alloy sheet, are 60 inches long (true length of weld), 6 inches in diameter at the top, and 20 inches in diameter at the bottom. Filler wire is used to weld the butt joint of cone "A," while cone "B" is fusion welded and planished. The inert gas process employing alternating current is used in both cases.

Note that the welding and planishing procedure costs 88% less (saving slightly over $2.00 per cone), due primarily to the elimination of microshaving and sanding, plus savings on filler wire and sanding belts.

Not shown are the costs of those unplanished cones that are ruined by failure of the weld joint during the spinning process. Planishing relieves stresses in both weld and parent metal, the primary cause of failure in unplanished cones. Joint efficiency in cone "A" is only 80% while that of cone "B" is

Precision fusion welding of butt joints and processing by roll planishing have opened up a myriad of new vistas in the fabrication of modern metals into reliable, inexpensive, lightweight parts suitable not only for aircraft and missiles but for general industry, as well.

Bellows; Honeycomb; Screen

For example, metal bellows can now be pressure formed of welded and planished tubing instead of tubing made of low quality, expensive resistant welded lap joints which have a high tendency to fail during subsequent processing. Close tolerance aircraft honeycomb structures now can be made in any width. Formerly honeycomb was confined to the narrow width of mill stock.

Airline has even developed machinery and techniques for welding etched 0.015 inch thick stainless steel screen with 260 precision etched 0.040" diameter holes per square inch, without altering the hole geometry. By the use of such machinery and techniques cylinders can be fabricated without lap joints or seams, and without destroying the continuity of hole pattern.

The development and application of more and more specialized alloys and once-rare metals are fortunately being made practicable by the parallel development of machinery to process them

TABLE 1

How Fusion Welding and Planishing Cuts Cost of Producing Aluminum Truncated Cones

Processing Cone "A" — Conventional Procedure

Welding wire for tacking tabs	$0.0005
Welding time of 4 minutes (at $3.00/hr)	0.2000
Microshaving time inside (10 min. at $2.55/hr)	0.4250
Microshaving time outside (8 in. at $2.55/hr)	0.3400
Sanding smooth inside (12 min. at $2.55/hr)	0.5100
Sanding smooth outside (10 min. at $2.55/hr)	0.4250
Aluminum filler wire (No. 4043-S)	0.0680
Sanding Belts burden cost (2 belts at $0.16 ea.)	0.3200
Total Cost	**$2.2885**

Processing Cone "B" — Welding and Planishing

Welding wire for tacking tabs	$0.0005
Welding time of 2 min. (at $3.00/hr)	0.1000
Occasional microshaving at starting and stop tab tack welds	0.0850
Weld roll planishing (2 min. at $2.55/hr)	0.0850
Burden supplies	0.0000
Total Cost	**$0.2705**
Savings Per Cone	**$2.0180**

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The original engravings for this advertisement were made on magnesium

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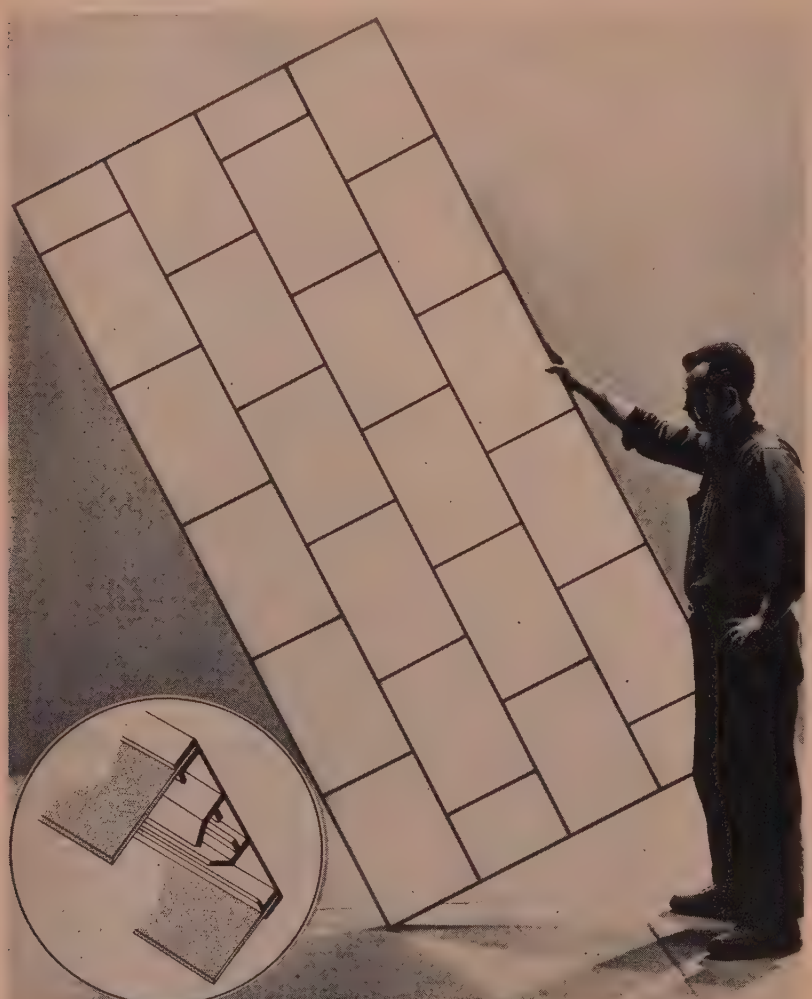
EXTRUSIONS + FIBERGLAS

make light, strong building panels

Sanpan panels are light in weight, rigid, weathertight; feature interlocking edges; should find wide application in building.

A RIGID translucent building panel has a variety of interior and exterior applications in many types of shelters. Named Sanpan, it is made by Panel Structures, Inc., 45 Greenwood Ave., East Orange, N. J.

Sanpan panels are assembled from fiberglas reinforced polyester skins bonded to heavy extruded aluminum frames and internal grids. They are supplied in a variety of sizes up to a maximum 4 feet x 20 feet and in colors for standard or custom installation. In the photo, a panel is held against background light to demonstrate its translucent qualities.



■ *Sanpan building panels are rigid because of heavy extruded aluminum framing and internal grids, translucent because of fiberglas-reinforced polyester skins. Insert drawing illustrates a key feature of Types B and C: An integral aluminum lip which protects the plastic edge along its perimeter.*

Light in weight (about 2 pounds p square foot), Sanpan panels transm soft diffused light. The insulating qu ities of these rigid, shatterproof un exceed those of glass block or doul glazed windows. When erected in c tain wall systems, accepted weather se ing practices are used.

Three Types; Many Uses

The panels are made in three typ having identical insulating, structu and acoustical properties. Type A h a plastic skin flush with the aluminu for use as curtain walls, exterior w panels, interior partitions, roof pane skylights, and canopies. Type B has integral aluminum lip protecting t plastic edge along the perimeter; it suitable for the same applications Type A Sanpan panels, as well as f room dividers, screens, and partitio

Type C has the protective lip, pl an integral joint system for interlo ing a series of units into rapidly sembled interior partitions or exteri panel systems.

In all three types the aluminu frame is joined both mechanically a by heliarc welding.

Varying color inserts in white, gree blue, rose, yellow and translucent wh can be specified with all three typ of Sanpan panels. Standard skins wei 8 ounces per square foot in the fib glas reinforced polyster plastic. Heavi weight, or fire retardant skins, a special decorative designs are also ma for use in custom units.

Sanpan panels are made in standa 48-inch widths in either 8-, 10-, 1 or 20-feet heights. Types A and are produced in 1½- and 3-inch thi nesses; type C in 1½-inch thickne Custom sizes are also produced with the limit mentioned for types A and Limit for type C is 4 feet wide by feet high.

"Installation and maintenance of Sa pan panels are inexpensive and eas the manufacturer said. "The panels sist impact, weathering, and vibratio and are unaffected by temperature a moisture."

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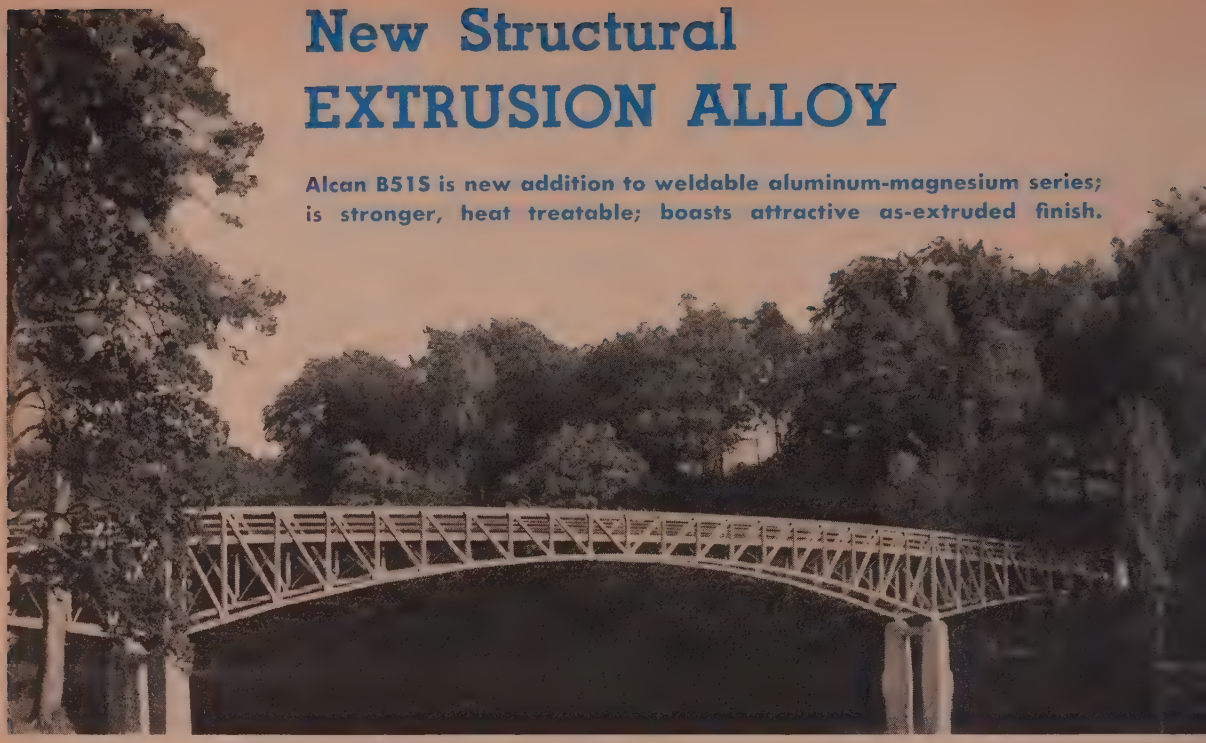
New Structural EXTRUSION ALLOY

Alcan B51S is new addition to weldable aluminum-magnesium series; is stronger, heat treatable; boasts attractive as-extruded finish.



BRIDGES, pipelines, dump trucks and fire escapes are just a few of the many logical application opportunities for an improved magnesium-silicide aluminum alloy, Alcan B51S, recently introduced to the U. S. market by Aluminium Limited Sales, Inc.

Specially designed and tested for medium strength structural use, B51S has a nominal composition of: magnesium, 0.60%; silicon, 1.00%; manganese, 0.60%, iron, 0.35%; the balance aluminum. Alloys of somewhat similar composition have been used widely for many years in England and Europe.

Anticorodal B is one of the European proprietary names applied to this composition. Others include Almasilium and Aludur 533. Names used in England include Dural H, Hiduminium 44, Birmetal 071, and the specification designations HE 10 and, after revision, HE 30.

One of the early, structural applications was the Cluny footbridge, near Pitlochry, Scotland (illustrated), which was erected in 1950. The material was Dural H, meeting the specification HE 10B which called for the composition containing 0.5% manganese. The metal was used in the fully heat treated condition and all rivets were made in Mg 5 alloy and driven cold.

Overall length of the bridge is 310.5 feet; the center span is 172.5 feet; and the two side spans 69 feet each. When examined recently the structure was in excellent condition with only slight roughening on the under surfaces of plates and sections.

Even more interesting is the satisfactory performance of welded window frames in a building at St. Ives, Cornwall, England, standing within 100 yards of the water's edge. After 13 years' exposure to a salt laden atmosphere—and sometimes sprayed by the sea—these window frames showed only minor pitting attack to an average depth of 0.002 in. The mechanical properties were still well above the minimum values required. The alloy is HE 10W (Mg., 0.8%; Si., 1.0%; Mn., up to 1%).

Such outstanding performance as in these specific instances has stimulated the continued use of this alloy in England and the development and introduction of Alcan B51S to the United States. Designers, architects and builders of light structures should appreciate the fact that the presence of manganese, nominally at 0.6%, gives Alcan B51S very good stress corrosion resistance and improved notch sensitivity.

In comparison with Alcan 65S (AA 6061), the traditional light structural alloy in the U. S., it boasts higher mechanical properties and improved extrudability while still retaining uniformly attractive as-extruded finish.

The superior strength of Alcan B51S (see Table 1) adds greatly to the range of structural applications in which the magnesium-silicide alloys may be used. The ultimate and yield strengths of the new alloy are higher than those of Alcan 65S and the elongation is approximately the same. The new alloy also compares favorably in notch sensitivity.

Alcan B51S extrudes substantially faster than does Alcan 65S under similar conditions, and less pick-up and fewer die lines occur. The as-extruded finish is more attractive in most cases, and the new alloy is generally cheaper to extrude. These advantages are more pronounced in porthole extrusions.

To realize the maximum mechanical properties, extrusion ingot should be homogenized prior to extrusion. Homogenization also helps avoid excessive grain growth, thus improving surface finish. Where rapid heating is employed, as with induction furnaces, homogenized ingot is necessary. When slower furnaces

Table 1 — Mechanical Properties of Alcan B51S and Alloy 6061

(guaranteed minimums shown in first column; typical values in brackets)

	Ultimate Tensile Strength (1000 psi)		Yield Strength (1000 psi)		Elongation % in 2 in.	
Alcan B51S-T4	27	(36)	17	(22)	18	(20)
B51S-T6	42	(46)	37	(43)	10	(13)
Alcan 65S-T6 (AA6061-T6)	38	(45)	35	(42)	10	(15)

re used, it may be possible to combine he homogenization and re-heating proc- sses, in which case a period of about our hours at 1030°F should be allowed.

The recommended extrusion range is 95-930°F, with container temperature n the range of 795-840°F. The alloy re- ponds well to water quenching at the ie, producing a condition which is then usceptible to age hardening. Recom- nended solution heat treatment temper- ture is 968°F ± 5°F, and recommended ageing is six hours at 338°F ±5°F.

The alloy's relatively high mechanical roperties make it suitable for numer- us structural uses requiring low or noderate strength. Its versatility is in- reased by its good weldability, a major dvantage that is exploited fully by sing the inert gas shielded processes. The inert gas arc welding method was sed in installing an oilfield pipeline n Breton, Alta. The line, installed by embina Pipeline Co., Ltd., consisted of -inch diameter Alcan B51S pipe with .188-inch wall thickness.

The alloy's performance in rural, in- ustrial and marine atmospheres is en- irely satisfactory. Under conditions of mmersion in fresh water it will per- orm well, but in salt water or brines, ts use is not recommended. In soils, xcept where there is contamination by inders, corrosive chemicals or some oil- eld brines, its performance will be qual to that of other aluminum alloys.

Where To Use It

Typical applications for which Alcan 51S is recommended include:

1. Architectural uses, involving struc- ural sections of all kinds requiring nedium strength such as stairways, rail- ngs and balusters, etc.

2. Transportation, including decking or road and air transport and structural nembers of road vehicles.

3. Structures, including portable ridges, aerial masts, electrical substa- ions, aircraft hangar doors, ladders, etc.

An outstanding recent application is n light wall extruded pipe for use as emporary portable pressure pipe in oil- elds, mines, and in the construction ndustry. In addition, it has been used or buried water injection and crude oil ines in oilfields where the soil and vater conditions are compatible.

Such compatibility is attested by the ondition of the buried crude oil line eferred to above. When 100 feet of this ine were unearthed in 1958 after one ear in service, the external surface of he pipeline was in the same condition s it was at the time of installation.

On the basis of case histories and ex- ensive development work preceding its ntroduction, it seems reasonable to con- lude that Alcan B51S will extend the ight structural uses of aluminum.

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Furniture: Outdoor, office, household	548
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Toys & sporting goods	272
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CONTAINERS & PACKAGING	**598**
Caps, closures, collapsible tubes	77
Foil converters: Cosmetic, food, beverage	79
Containers, all types	236
Shipping & luggage	26
Spools & reels	22
Drums, barrels, receptacles	40
Tanks, all types	83
Containers, household	35
ELECTRICAL INDUSTRY	**2019**
Communications: Radio, TV, phone	469
Electronics: Equipment & parts	570
Electrical equipment, heavy	106
Electrical equipment, light	87
Fixtures & fittings, incl. lighting	429
Motors, heavy & light	160
Wire & cable	198
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Industrial, general purpose	515
Engines	181
Mining & construction	80
Compressors, pumps, blowers, valves	449
Agricultural & dairy	388
Ladders & scaffolds	137
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Aircraft, navigation, vehicle	241
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Safety equipment	94
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Fastener mfrs.: Screw machine shops	668
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MISCELLANEOUS INDUSTRIES	**1137**
Chemical & metallurgical	127
Manufacturing, special & misc.	446
Signs, nameplates, displays, frames	320
Metal specialty manufacturers	244
U.S. TOTAL	25,339

Redesign in Die Castings Sparks Power Mower Sales

Evolutionary program does more than change the face and name of Montgomery Ward's power mower; it's a better grass cutter. Die castings help hold price line because they trim production costs.

by Kim Darby, Associate Editor

IT ISN'T surprising that the endless flow of Americans to the suburbs and the construction of 10 million single family homes in ten years have been accompanied by rising sales of appliances and other labor saving home equipment.

The lawn mower industry is one of many that have cashed in on this postwar exodus. What's more, its product has grown greatly in value, what with the decided trend away from the primitive pusher mower to today's motorized and self-propelled jobs. The number of companies making power mowers has mushroomed from 26 in 1946 to about 200 today. Last year they knocked out some 3.5 million units with a total retail value of $245 million.

While the growth rate of the power mower industry in the past three years has averaged little more than 10% per year (considerably lower than most of the housekeeping and home care items), Montgomery Ward can point to a 100% increase in sales of its power mowers in the same period. This is no mean achievement for a firm that had been marketing garden equipment for more than 50 years without ever before giving its competitors serious cause for concern.

Merchandising people at Ward's attribute this success to a slick redesign program in which the aluminum die casting process played a major role in achieving both decorative and functional effects.

The re-design program was started in 1956, and affected hundreds of lawn and garden products. It brought physical changes in mechanical equipment (mowers, tillers and garden tractors) and better looking packages for grass seed, fertilizer, etc. The objective: A "family" identity covering the entire Garden Mark line of garden and lawn products. Fountainhead of this continuing project is Dave Chapman, Inc., Chicago, a firm of industrial design specialists.

In redesigning the power mower, objectives were to make functional improvements that would tend to make grass cutting fun rather than drudgery. The mower was also given a sleek new appearance to stimulate pride of ownership and convince customers that this was a new and better mower.

"Distinctive changes in appearance are the best way to immediately put the idea across that the prospective buyer is looking at something new," explained Frank Carioti, a vice president of the Chapman organization.

With this in mind, Chapman's designers achieved a simple and inexpensive, yet obvious change in appearance of the 1958-59 model by reworking the die used in producing the deck of the 1957 model.

■ *Decks for the 19-inch model are produced by Alcoa Hillside, Ill., die casting plant. Alcoa also produces the yoke for this line.*

Ward's power mower line is composed of three models, the low and medium priced "pusher" type units, and the deluxe self-propelled model. The low priced model has a stamped steel deck and steel wheels; the medium priced unit has all the aluminum components of the top model of the line, minus the self propelling feature.

All models have exterior height adjustments for the wheels. Whereas the 1956 mower had the wheels at the four corners of the deck, subsequent models have the right front wheel in a recessed position for closer cutting along walks and at corners. The wheels of the '56s were all the same size, but the '57s and '58-'59s were given smaller front wheels more in keeping with the job they must do.

Die Castings Save Weight

A new gear mechanism on the self-propelled models will disengage the gear by a downward pressure on the hands, allowing for easy turns at sharp corners. The entire gear mechanism is recessed in the die cast aluminum frame and covered with a rear plate. The result is a smooth, one-piece frame with no gear box showing as it had on previous models.

By die casting aluminum shrouds and incorporating the gear box, an overall weight reduction of 8½ pounds was achieved. The original permanent mold cast shroud (17 pounds, 3 ounces) and gear box (8 pounds, 8 ounces) had a total weight of 25 pounds, 11 ounces. The new die cast deck (14 pounds) incorporates the gear box (3 pounds 5 ounces) for a total weight of 17 pounds, 5 ounces. The reduction produces specific advantages in shipping costs, as well as the obvious savings in material costs.

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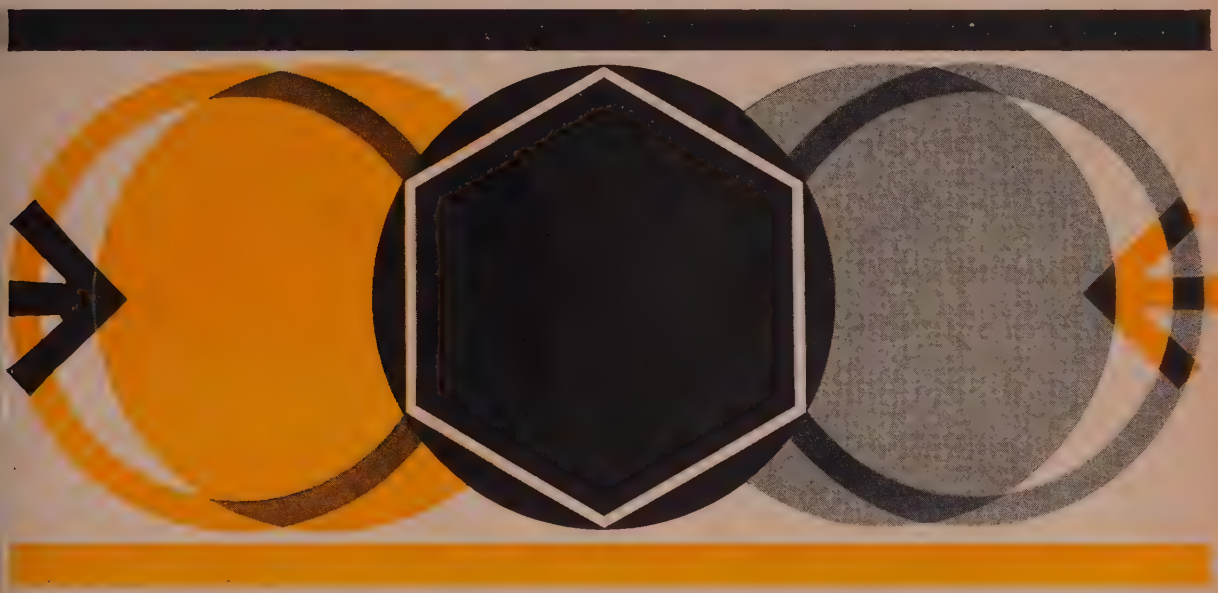

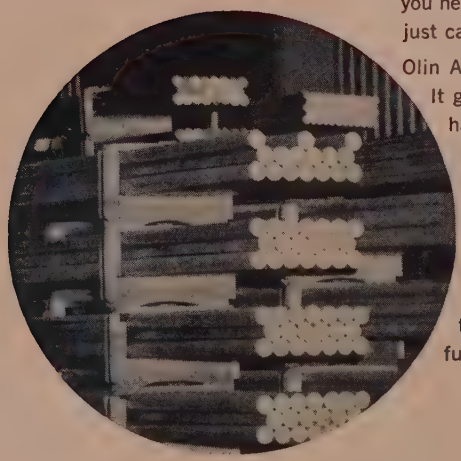

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■ *This is how the 1957 Garden Mark power mower line looked. Shown from left to right are steel decked economy model, pusher model, and self-propelled unit. Dave Chapman, Inc. industrial design team designed the line in 1956; compare it with models for 1956 and Chapman's 1958-59 version on page 54. The program gave sales a decided boost.*

place in this new design problem, the Dave Chapman experts had no difficulty in establishing these major considerations in the design of the power mower and other garden equipment lines:

1. Safety in operation.
2. Improved efficiency.
3. More pleasing appearance.
4. Lower prices, or at least more worthwhile features for the same price.

Standard Parts Cut Costs

Granted that the designers have been eminently successful in producing a handsomer power mower that will do a better job, perhaps a greater achievement has been the design of components that can be used not only in the mower but in other Garden Mark equipment as well.

For example, the shroud used on the 1958-59 self-propelled mower is also used on the tiller-mower. The hub-caps designed for the mower wheels are also used on the wheels of the roto-tiller, tiller-mower, garden tractor and ride-on mower. A fifth hub-cap also serves as an identifying ornament on the garden tractor and ride-on mower.

While the decks of the '57 and the 1958-59 models changed little in appearance, the latter was given a new "all-control" handle which also is used on the deluxe reel type power mower.

Still another example of interchangeable parts is the mower handle shaft, the tooling for which permits variations in length so that handles can be produced in different lengths for other members of the Garden Mark family. The die cast aluminum yoke at the bottom of the handle is also used elsewhere in the line.

In this way, Montgomery Ward gets more mileage out of the tooling, achieves a distinctive type of "family" product identification, and keeps the retail prices down.

Evidence of the success of Chapman's design program is the fact that while the power mower season is considered over by Mid-July, Alcoa's Hillside, Ill., die casting plant was scheduling another substantial quantity run around that time. Indications are that this has been the case ever since 1956, when Alcoa and the Rupert Die Casting Division of Pierce Industries, Kansas City, Mo., were handed the die casting assignment.

If Ward's aggressive merchandising plans were to be implemented by economical volume production, the permanent mold casting method, last used for the 1956 models, would have to be abandoned.

■ *Rupert Die Casting Division makes decks for Garden Mark's 21-inch mower, as well as aluminum wheels for the unit. Large die for the deck is shown in a Rupert machine.*

"Permanent mold and sand cast decks are used by manufacturers who haven't the volume to warrant the high initial cost of die casting dies," a Montgomery Ward executive commented. "Your base price of sand and permanent mold parts will be higher than die castings because there is more metal in them. You don't get the same high finish and close tolerance work that are obtainable by die casting, so costly finishing operations have to be performed."

Big Die Castings

There are two sizes of the Garden Mark rotary power mower, the 19-inch and the 21-inch. Decks for the 21s are made by Rupert, who does the job on a 1000-ton Lake Erie machine at a rate of 600 castings per day.

"The finished casting weighs 16 pounds and all wheel and engine mounting holes are cast in by movable sliding cores in the die," a Rupert executive reported. "The Montgomery Ward deck is one of six different types we are currently producing for various lawn mower manufacturers."

Alcoa casts decks for the 19-inch model on four 800-ton machines. This deck measures 21 inches wide, 28 inches long and about 4½ inches high. In both models, the thickness of the casting is about ⅛ inch. Production rate at Hillside is generally about 40 per hour per machine. Lindberg Fisher automatic ladlers are used here.

The rough die castings are trimmed in Bliss trim presses, after which they are placed in fixtures for hydraulic punching and drilling of holes. Simple

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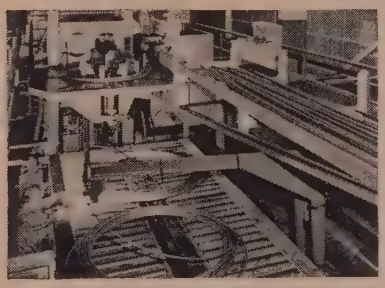

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hand filing is all that has to be done to the pieces prior to boxing for shipment to Montgomery Ward's Moto-Mower Division in Richmond, Ind., where final assembly is done. Motors made by Briggs & Stratton and other manufacturers also consist almost entirely of aluminum die castings.

At Richmond, the decks are hung on a conventional I-beam conveyor for an uninterrupted trip through a degreasing, drying, spray painting and baking operation. Conveyor speed is considered unusually fast at 12 feet per minute.

In degreasing, the decks are given a hot spray bath of Macco Machine Cleaner 40, then rinsed and dried with hot air blasts.

"Our three-stage, gas-fired spray type degreaser is the same as is used for oil coated steel parts," said Don Alexander, product planning manager at Richmond. "The function for aluminum is to remove loose aluminum particles, foreign bodies and dust. Actual degreasing of the aluminum decks as received is not required."

The first paint operation is hand spraying the center panel of the deck with gold enamel. This coat is baked dry when the decks are given an 18 minute trip through Young & Berke ovens at 300° F, giving the deck "an automotive type finish."

A unique masking operation is performed as the decks move toward the next paint application. Fiberglas "snap-on" masks fit over the already painted center panel.

"Actual aluminum castings are used for the form for layup of the nylon mat and fiberglas, so there is a positive tight fit when cured," Alexander said. "We have used the masks about 1600 times each without replacement. Estimated life is 3000 times. The masks are ru 1000 times before cleaning, which done mechanically."

A Ransburg electrostatic painting sy tem is used to apply the white enam with which the outside areas of the dec are then coated. The masks aren't take off the pieces until after the secon bake.

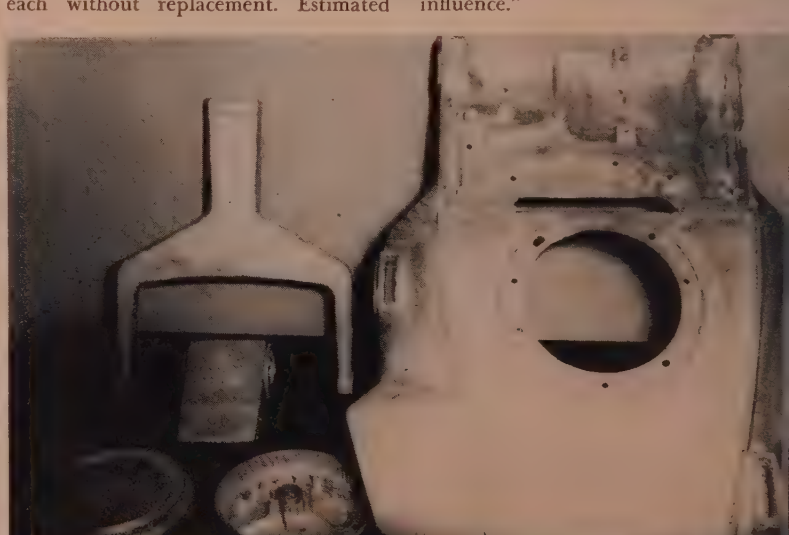
New Designs Did It

Actually, the decks are given a thre color paint job because (contrary t what the photos show) raised letterin on the decks of some models are painte black. Parting lines between gold an white areas are also covered with blac stripes. This operation is done manu ally with a Briar gelatin roll after th pieces come off the conveyor.

"The method is simple," Alexande explained. "We spread the screen pro ess lacquer on glass, then to the rolle and a quick neat roll on the part. Orig nal production was sanded back to ba aluminum but was changed for bett contrast."

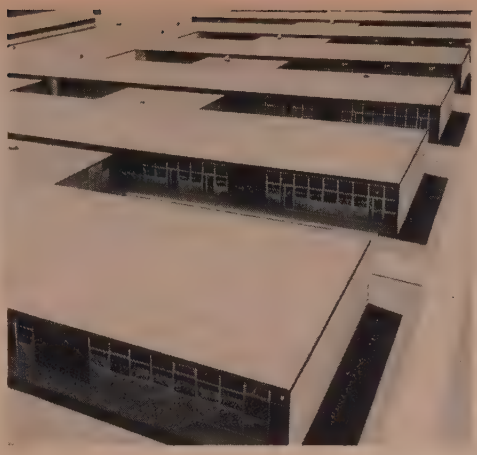
While people at Montgomery War are aware that their Garden Mark pow mowers are priced a few dollars belo other nationally advertised makes, the do not believe that price is the reaso for the recent success of their product They are convinced that the restylin program — particularly the superior d sign in aluminum die castings — d serves most of the credit.

"We've grown tremendously in th face of a relatively static market," com mented Dave Fish, who heads up pu chasing for the company's lawn an garden department. "We feel that majo changes in the functional and visu aspects of the line have been a gre influence."



■ *Unfinished aluminum die castings for the Garden Mark power mower—deck, hand yoke, wheels and control housing—are produced by three concerns (some zinc d castings are used). Final assembly is at Ward's Moto-Mower Division, Richmond, I*

Engineering laboratories at the new Convair (Astronautics) plant, San Diego. All exterior aluminum is protected against atmospheric staining and oxidation with a clear, colorless coating of Butyrate lacquer.



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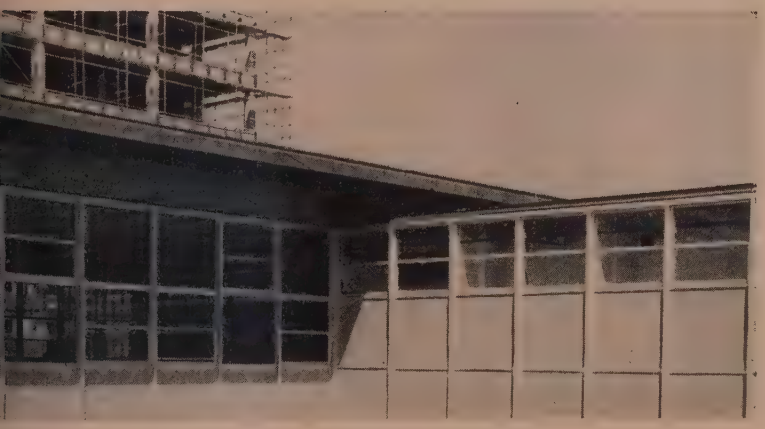
An informative 15-minute, 16mm. sound color film has been produced especially for viewing by those who design in or specify aluminum for outdoor use. Would you like to see it? See below.



Butyrate lacquer, applied immediately after fabrication, protects the aluminum-framed sections, manufactured by Metalco, Inc. of Emeryville, California, from mortar staining and abrasion during erection and from weathering afterward.

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3. Send for sound color film. Please indicate the date you plan to show the film and an alternate date.

4. Write for names of manufacturers of Butyrate lacquer in your area.

6 GOOD QUESTIONS ABOUT ALUMINUM FINISHING . . .

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Here are the answers Kaiser Aluminum Distributors have given to specific questions about finishing aluminum asked by various fabricators. If you don't see the answer to your question here, ask *your* Kaiser Aluminum Distributor.

Q. We're tooling up for a new design having a frosted finish. What's the best way to get a frosted appearance on aluminum?

A. Etching with an alkaline solution is the most common method of producing a frosted finish on aluminum. A 5.0% solution of sodium hydroxide, or a solution containing 5.0% sodium hydroxide plus 0.5% sodium fluoride, can be used. The temperature of the solution and the time allowed for etching are determined by the degree of etch desired. Aside from etching, you could polish the aluminum surface with an extra fine abrasive cloth, or air blast with fine abrasives.

Q. Technically, what is anodizing and how thick is an anodized coating?

A. Anodizing is an electrochemical finishing technique that works like this: Aluminum is made the anode in an electrolytic cell containing an acid electrolyte, such as 15% sulfuric acid. The surface of the aluminum is converted to a hard, corrosion resistant film of hydrated aluminum oxide. After the oxide film has formed, it may be converted, by a very simple procedure known as sealing, to a more definite crystalline form of aluminum oxide with increased corrosion resistance. By varying the anodizing conditions, different thickness can be achieved. Normal commercial thickness ranges from 0.0003" to 0.0009".

Q. We're using alloy 5005 sheet and extrusions. What alloy or alloys will give us a good color match for anodizing?

A. The chart in Figure 1 will show you color matches for various aluminum alloys at a glance.

Q. How can I polish a contoured aluminum surfa

A.

One of the best methods is to a brush-backed, motor dri polishing head as shown h The abrasive cloth is serra and is located in strips al nately between the brushes the polishing head revolves brushes adapt themselves to contour and the abrasive c does the polishing.

Q. Is surface preparation necessary before pain aluminum?

A. Since an aluminum surface does not naturally l paint (has no "tooth") it is necessary to prepare surface before painting. Two general methods used: (1) Chemicals combined with the prime etch while the primer is drying, and (2) Etch surface with chemicals first, then apply the pain a conventional manner. Usually the application primer is advisable to minimize paint failure. paint used should be top quality, but avoid l base paints.

Q. Which abrasive do you recommend for polish aluminum — carborundum or aluminum oxide

A. If no subsequent finishing is required, good res can be obtained with either. However, if the minum is to be given a final anodizing treatm imbedded polishing residues from carborund (silicon carbides) will often produce mottled, d ened surfaces. In such cases, it's best to use alu num oxide abrasive to avoid such discolorations.

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Fig. 1

APPROXIMATE COLOR MATCHES OF ANODIZED ALUMINUM ALLOYS

0 = Relatively Good Matching X = Better Matching

	Sheet and Plate Alloys											Extrusion Alloys				
Sheet and Plate Alloys	1100	2024*	Alclad 2024	3003	5005	5050	5052**	6061	Alclad 6061	7075*	Alclad 7075	3003	2024*	6061	6063	7075*
1100	X	0	X		0					0			0			0
2024*	0	X			0								X			
Alclad 2024	X		X													
3003				X								X				
5005	0	0			X	0	0	X		0			0	X	X	0
5050					0	X	0	0		0				0	0	
5052**					0	0	X	0						0	0	
6061					X	0	0	X						X	0	
Alclad 6061									X		X					
7075*	0				0					X						X
Alclad 7075									X		X					
Extrusion Alloys																
3003				X								X				
2024*	0	X			0								X			
6061					X	0	0	X						X	0	
6063					X	0	0	0						0	X	
7075*	0				0					X						X

Heat treated and quenched. **For relatively thin anodic coatings, i.e., not exceeding 20 min. anodizing time.

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CORN CEREAL BINDER SPEEDS PRODUCTION OF CORES FOR CASTINGS

Use of standard corn cereal binder at aluminum foundry improves green strength and sag resistance of cores; reduces need for reinforcement.

by George Horner, Core Room Foreman, Fischer Casting Co., Inc., Middlesex, N. J.

EXPANDED use of a standard corn cereal binder has speeded core production and improved core performance at Fischer Casting Co., Inc., Middlesex, N. J. Its use in more and more of the foundry's sand mixes for casting aluminum has brought about a substantial improvement in green strength and sag resistance of cores. Many cores that formerly were reinforced with rods, wires and nails to prevent sag can now be turned out without artificial aids.

Established in 1903, Fischer Casting moved to its present location in 1953. The company now occupies a new building with 48,000 square feet of productive space, and serves many industries throughout the eastern seaboard. It operates its own engineering department, research and test laboratory, and pattern shops for both metal and wood.

The foundry employs the sand, permanent mold and shell mold processes, and pours an average of 30,000 pounds of bronze and an equal tonnage of aluminum per day.

Castings are produced for manufacturers of heavy machinery and equipment, water meters, valves, electronic equipment, missiles and airframes and industrial equipment. Quantities ordered run from one to several hundred thousand castings. Many customers have been served continuously since the founding of the business.

Principal sand used for core mixes is a washed and dried New Jersey sand of AFS 100 fineness. It is delivered in trucks while still hot to avoid picking up moisture, and is conveyed to the mullers through chutes from two 22-ton storage silos. Hand operated gages on these chutes release sand to a weigh hopper mounted on wheels.

Sand movement is indicated by signal lights at the mulling station. A blue light indicates that sand is going up the elevator to the storage hopper. A red bulb lights when sand is coming down from the silos to the mullers.

To satisfy the requirements of exacting specifications, some nine different sand mixes are used at Fischer Casting.

The foundry's standard green strength binder is Mogul corn cereal binder produced by the corn wet milling process by Corn Products Co. A liquid urea formaldehyde plastic resin binder is used for baked strength.

Corn Products Sales Company's Globe Dextrine No. 8071 is added to many of the mixes for surface hardness. During baking of the cores the dextrine migrates to the exterior surface, imparting superior strength and scratch hardness to the surface of the cores.

Two Typical Mixes

A typical mix for bench-made cores is formulated as follows:

Washed and dried New Jersey sand, 100 AFS	300 lbs.
B242 Mogul corn cereal binder	4 lbs.
Urea formaldehyde plastic resin	6 lbs.
Corn Products No. 8071 dextrine	2 lbs.
Water	4 qts.
Release agent	1 qt.

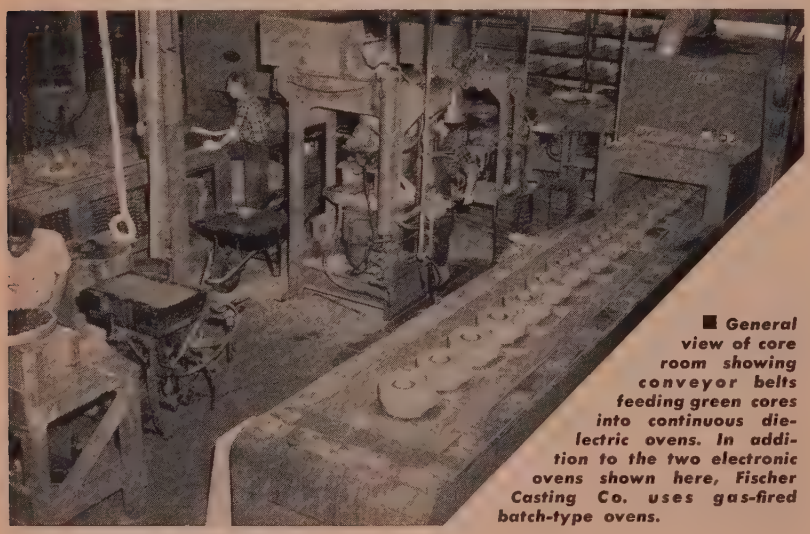
The release agent is a 3-to-1 mixture of kerosene and oleic acid. For cores which are to be baked in dielectric ovens, ¾ lbs. of boric acid is added to the above mix.

A typical mix for either blown or rammed cores to be cured in gas oven is put together as follows:

Washed and dried New Jersey sand, 100 AFS	300 lbs.
B242 Mogul corn cereal binder	2 lbs.
Urea formaldehyde plastic resin	6 lbs.
Corn Products No. 8071 dextrine	2 lbs.
Water	3½ qts.
Release agent	1½ qts.

Clearfield single wheel mullers are used. The usual mulling cycle at Fischer Casting is:

2 min. dry (sand, cereal, dextrine)
4 min. wet (water and liquid binder added)
30 seconds, release agent added
6½ minutes



■ *General view of core room showing conveyor belts feeding green cores into continuous dielectric ovens. In addition to the two electronic ovens shown here, Fischer Casting Co. uses gas-fired batch-type ovens.*

Bench coremaker hand rams sand into ...e box. Sand mixes made with corn ...eal binder have good workability; ... exhibit high green strength proper... without stickiness.

These sand mixes have good flow... lity and workability for all of the ...emaking processes used at Fischer ...ting—bench work, core blowing and ... larger cores made on roll-over ma... nes. Sand properties are under lab... tory control throughout the coremak... procedure. Laboratory personnel ... ke continual checks for green com... ssion strength, green and dry perme... lity, and baked strength.

...hell molding and silica gel bonding ... the CO_2 process are also used where ...se processes are applicable to the ...oduction problem.

The sand mixes detailed above are ex... lent for blowing. As many as 210 ...-pound cores an hour are blown on ...ore shooter.

...ince Fischer Casting regularly turns ... many aluminum castings that are ...sidered difficult to produce, the prob... ...s in coremaking encountered at this ...undry are far from routine. Many ...es are of intricate shape; many in... ...ve a high stand or overhangs.

In making such cores, the superior ...en strength and resistance to sag im... ...rted by the cereal binder are an im... ...rtant aid to production. While Mogul ... been used here for many years, its ...cial properties have recently been ...re fully appreciated and more widely ... lized. During the past three years, ...rying amounts of the corn cereal ...der, ranging from ¾% to 1½%, ...ve been included in more and more ... the sand mixes.

An important benefit, stemming di... ...tly from the superior green strength ...d sag resistance of Mogul-bonded cores, has been the elimination of reinforcing rods, wires and nails from many cores where their use was formerly considered indispensable.

For example, some cores as large as 12 inches high stand in the green state without sag. A valve core, so intricate in shape that it is placed on a core rest of molding sand for drying, is now made regularly without wires. A meter core, with unsupported horizontal spuds two to three inches long and only ¼ to ⅜ inch in diameter, is now made without reinforcement and invariably stands without sag.

A pump housing core with a cast iron chill inserted must have unusual green strength to hold the chill in place without sag. This core also has a 2-inch overhang of a 1-inch thick section, which holds its ± .015-inch tolerance.

Small diameter rod-shaped cores, ½-inch diameter and about 7 inches long, are now made without wires. Twelve of these are blown at one time, with no sag or deformation in green cores.

Other cores whose production without reinforcement represents a real achievement are a mushroom shaped core with a chill in the center of the top and overhang all around, and a cylindrical core about 10 inches in diameter by 24 inches long, with slots and bosses.

On one intricate housing, seven cores are used together. All dimensions must be held to ± .015 inch. Any sag in the cores would ruin the casting.

In evaluating this performance, it should be noted that these are high production cores, with all dimensions held to close limits of precision.

Both continuous dielectric ovens and batch-type gas-fired ovens are used at Fischer Casting. Two of the electronic ovens are installed. Their operation is automatic; continuous belts feed into the ovens at a speed of 9 ft. per minute, and cores bake in two to three minutes.

The drying principle is induction heating, employing radio frequency. The action is similar to infra-red drying in that it is a dehydrating action, employing little heat, and the cores dry from the inside out.

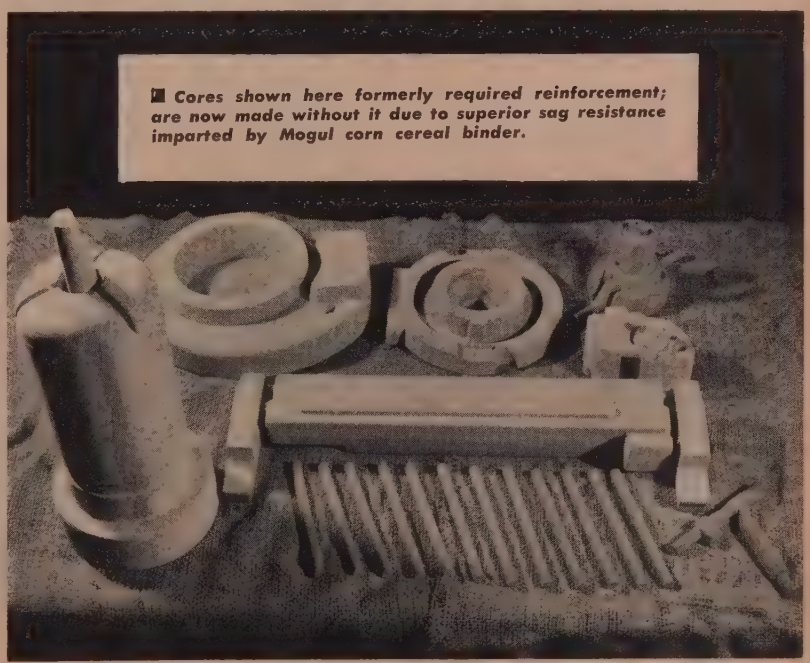
Finished cores are tested for dimensional accuracy, surface condition, and hardness. Scratch tests reveal the contribution of the Globe Dextrine No. 8071 to skin hardness of the cores. Cured cores are finished, when necessary, to remove roughness and seams.

Another Tough One

An example in which both green strength and baked strength play important roles is the core for an air-cooled finned cylinder head. In this core there are closely spaced parallel fins of sand, less than ⅛ inch thick and fully 1 inch high. (This core is illustrated at the top of opposite page.)

Good collapsibility is an important requirement of sand cores for the intricate aluminum castings produced here. The used cores must crumble and fall out easily in order to avoid damage to the light metal castings.

Core knockout is easily and safely accomplished with air-operated jack hammers. The hammer is placed on the riser of the casting, and operation of the hammer loosens and breaks up the core. The easy knockout is attributed in part to the use of binders which enable the cores to disintegrate readily at the knockout station.



■ *Cores shown here formerly required reinforcement; are now made without it due to superior sag resistance imparted by Mogul corn cereal binder.*

FINANCING EXPANSION . . .

can be a tough problem for any metalworking firm that has its working capital tied up in accounts receivable. If normal bank credit is unavailable accounts receivable can often be converted into cash for expansion by a commercial finance house.

by Raymond V. Keller, Vice President, James Talcott, Inc.

BUSINESS is good in the aluminum industry. More than 2.1 million tons of aluminum will be consumed in 1959. Extruders alone will use about 450,000 tons.

But many metalworking men can tell you that sales are good but profits are slim.

Rising production costs, higher prices, tougher competition, price cutting—these are some of the profit-shaving headaches that are plaguing producers of nonferrous metals and products. In many instances, executives are making plans to meet these problems. They want to expand capacity, update plant and equipment, introduce new production methods and office procedures, set up research, develop new markets, diversify with new products.

But continually rising costs must be whipped and cost controls established before such measures can be taken. Modern equipment is essential if costs are to be drawn into line, but new equipment costs money.

It sounds like an ever-tightening circle. In many ways, it is. But proper use of enough money at the right time can turn stagnation—or potential disaster—into the jolt of energy needed to move the company forward. The company with enough working capital, operating controls and know-how can beat the problems facing it.

The problem is this: How can a company get enough extra money when it needs it?

The most obvious place to seek growth funds is a bank. But, as many metalworking executives have been chagrined to find, banks can't always lend enough. Working under restrictions concerning the nature and amount of loans they may grant, banks can't always be the answer.

The executive then usually considers offering more stock, but that involves further dilution of control. Selling bonds is another possibility, but that means taking on a long-term debt with many operating restrictions, a distasteful prospect to the executive in need only of interim financing.

So he goes back and sits down with his banker and asks for advice. Quite often, his banker will send him to a commercial finance company.

Commercial financing is an old practice, but still not fully understood in the metals field. Talcott, one of the country's oldest and largest independent commercial finance and factoring firms, has helped many metal-working companies. Here's how:

Turns Receivables Into Cash

A commercial finance company will advance funds by lending up to about 80 or 90% of the value of its client's receivables on a continuing revolving loan basis. Advantage: Instead of having working capital tied up in accounts receivable not due, the client receives operating capital when it is needed to produce more, to ship more, to sell more, and to profit more.

When its customers pay their bills, the client simply turns the payments over to us. The customers are not notified of the financing arrangement.

Talcott's Raymond Keller

"Instead of having working capital tied up in accounts receivable not due, the client receives operating capital when it is needed to produce more, ship more, sell more, and profit more."

Mortgage financing is also availab to the firm dealing with a commerci finance company. If a client needs ne machinery, but can't get the mortga money from the bank, Talcott will a vance the necessary amount and a cept the pledge of fixed assets as c lateral.

If a client is already dealing satisfa torily with the commercial finance co pany on an accounts receivable bas he will usually be able to obtain a other needed funds on a mortga basis for sound purposes and growt

There is still another way a met working firm can profit from dealin with a commercial finance compan Manufacturers of income producing m chinery, such as a machine tool, fi it essential today to offer time payme terms to potential customers. Finan ing and handling of this time sa paper is highly specialized. Comm cial finance companies arrange pla to help close these sales.

Talcott's Time Sales Division is example of how a commercial finan company can help. The finance co pany will offer, on a continuing ba to purchase paper generated by ti payment sales, paying the manufactu cash at time of shipment. The ma facturer's client is notified of the rangement and is directed to make payments directly to the finance co pany.

The manufacturer has its money a no collection or bookkeeping proble and, for practical purposes, has m a cash sale.

Here is how some metalworkers h utilized commercial financing:

A midwestern manufacturer deci in 1951 that substantial expansion co be profitable. He built a large mod factory and warehouse. Product quadrupled.

Early in 1952, the company's offi discovered that normal bank credit not sufficient for financing the grow inventory and accounts receivable. April, the company's bank advise to seek the help of a commercial fina

ıpany. After doing so, the company tinued to expand.

By 1953, sales volume had climbed $12,000,000 as compared with $2,500,- in 1950. Reason: Money had been de available through an accounts eivable financing plan, tailored to ac- nmodate the company's growth needs. is permitted the company to profit- y weather the initial shock of ex- nsion and enjoy the full benefits and ostantial profits of its expanded fa- ities.

truder's Problem Solved

Another case involves a firm that ginally processed and sold extrusions ıde by other firms. In 1950, net sales $459,000. Within two years, sales d climbed to $1,373,600 with a cor- ponding jump in profits.

Exhilarated by its success, the com- ny initiated an expansion program ich included buying its own extru- n press. A bank loan was negotiated pay for it. Receivables were sold, thout recourse, to another bank.

Instead of a continued growth, how- er, the company found itself hampered the fact that the banks necessarily re strictly limiting the amount of dit which the extruder could grant its stomers. Prospective buyers were turn- g to other extruders who could grant tter terms. Business was falling off stead of showing the expected hike.

The bank's advice: Go to a com- rcial finance firm.

The company's net worth was about 93,000 when we took it on as a client. o longer held back or restricted, the mpany was able to borrow enough to gain its position.

Talcott helped again a year later hen it suggested that the extruder y the capital stock of a producer aluminum billets. By doing so, the mpany is now in the position of ing able to produce its own billets d make, sell, and process extrusions. Five years after the financing arrange- ent began, the extruder reported net les of $4,615,600. Tangible net worth d increased to more than $1,000,000.

As was planned, the company was now a position to utilize only bank credit d it terminated its arrangement.

Factoring or commercial financing is ot a panacea for all financing prob- ms, and commercial finance officials e among the first to emphasize this. is not suitable for (and usually is ot available to) companies in serious ancial trouble.

But it can help a sound and grow- g metalworking company get over its owing pains and into a position here it will be worthy of and able rely solely on bank credit.

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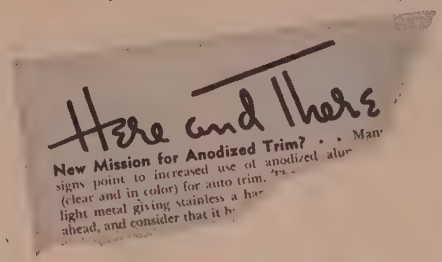
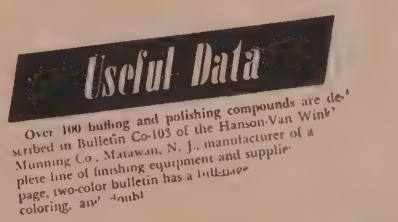
THE ANSWER to this question is of vital concern to every industrial advertiser, for it determines whether his message is getting through to the reader; whether he is getting maximum mileage out of his advertising dollar. Without an attentive audience, the advertiser's message goes unseen, unheeded.

The editorial departments of **MODERN METALS,** as well as the feature articles in this issue, are well calculated to capture and keep the reader's attention.


Here and There

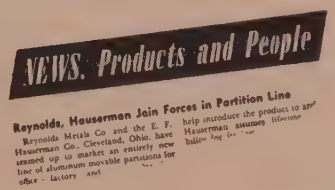
New Mission for Anodized Trim? ... Many signs point to increased use of anodized alu- (clear and in color) for auto trim. ... light metal giving stainless a ha- ahead, and consider that it h-


Useful Data

Over 100 buffing and polishing compounds are described in Bulletin Co-103 of the Hanson-Van Winkle Munning Co., Matawan, N. J., manufacturer of a plete line of finishing equipment and supplie- page, two-color bulletin has a full-page coloring, and detail

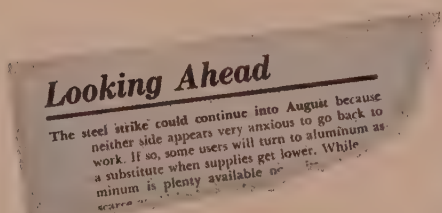
New Enterprise

Olin-Mathieson Chemical Corp., Electrical Division is marketing Jet-Spot, aluminum bodied flashlig- which features the industry's largest transpa- rim. Designed so it


NEWS, Products and People

Reynolds, Hauserman Join Forces in Partition Line

Reynolds Metals Co. and the E. F. Hauserman Co., Cleveland, Ohio, have teamed up to market an entirely new line of aluminum movable partitions for office - factory and help introduce the product to arc Hauserman assumes lifetime billin- leg for


Looking Ahead

The steel strike could continue into August because neither side appears very anxious to go back to work. If so, some users will turn to aluminum as a substitute when supplies get lower. While minum is plenty available no- scarce

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Strubing Can Be Shipped in Flat Form; Inflated On-Site

Experimental production of thin wall seamless tubing that can be shipped in ribbon form and inflated at the point of use will begin this fall at Wolverine Tube Division of Calumet & Hecla, Inc., Allen Park, Mich. The technique can be used for a variety of metals including titanium, zirconium, copper, tantalum and columbium, but indications are that it would be particularly advantageous in many areas where aluminum is the accepted material.

Strubing (strip tubing), offers two major advantages, according to Wolverine Tube. First, point-of-use inflatability makes it possible to ship thin wall tubing economically, since only the tube "walls are shipped and not the hole." Second, the cold rolling process used in making Strubing provides an economical means of producing thin wall tubing of materials and in thicknesses either unavailable today or available only at prohibitive cost.

Field inflatability might make it possible, for instance, to ship 500-ft. rolls of Strubing to a large farm irrigation project in a few orange crate-size boxes instead of in trailer-truck loads. The material would be unrolled in the field, inflated, and holes drilled in the walls for water outlets.

In the packaging field, Strubing in foil thicknesses holds promise as a packaging material for frozen foods, toothpaste or materials of similar consistency, or simply as a covering for food for reheating.

"It would be easier to insert a chicken in a length of Strubing and crimp the ends than it would be to wrap a foil sheet around it," a company spokesman explained.

Strubing isn't hard to make. The first step is to make a simple hollow shape by conventional methods — extrusion, for example. It is then passed through a rolling mill for flattening into ribbon form. The rolling process elongates the original tube by making it thinner without changing the inside tube diameter. The more passes through the mill the thinner the Strubing.

"Diameter of the Strubing is limited only by the size of the starting piece," the C & H man said, "and the size of the starting piece is limited only by the capacity of the rolling mill used."

A pair of fins or ribs on the outside may act as stiffeners — often desirable in thin walled tube — or can be removed as the Strubing is being formed.

The left photo above shows sequence of aluminum Strubing manufacture. At top is a section of 3-inch diameter base tube. This is flattened into shapes shown in middle (additional mill passes produce the thinner strip). Large tube section at bottom is Strubing.

A length of aluminum pipe, suitable for downspouts for a home, is shown at right.

This is the third new tube-producing process introduced in recent years. Olin Mathieson's Roll-Bond process (see MM, Nov., '54) can produce an extremely complex maze of tubing such as used in a refrigerator evaporator. The tube pattern is produced by roll-bonding two sheets of aluminum, one of which has the tubing pattern printed in a special "resist" ink. A blast of compressed air inflates the tubing pattern after the material has been rolled to the required length.

The Tube-In-Strip process (see MM, Feb., '56) developed by Revere Copper & Brass Inc. starts with a rolling billet in which special "resist" rods have bee cast in. As the billet is rolled down t sheet, the resist material crushes an elongates along with the metal. Thi the sheet (either coil or flat) has a integral tube pattern which may be i flated on-site with air pressure.

Obviously, the main similarity b tween these three processes is that th final tube is achieved by inflating wit air, water or hydraulic pressure. T what extent the three processes wi compete with each other is difficult determine at this time, but it seem certain that aluminum will play a gre role in the success of each process.

Baltimore Brewer Will Use Aluminum Cans

Beer packaged in drawn aluminu cans marks another development in th use of the light metal by the brewin industry.

Gunther Brewing Co., Baltimore, wi soon begin marketing its beer in th lightweight cans in Maryland, the Di trict of Columbia, Virginia, Pennsy vania, and Delaware. The new co tainer was developed after many montl of research by Gunther in co-operatio with the American Can Co. and Kais Aluminum & Chemical Corp., and mar the first time that beer has been pac aged for sale in the U. S. in a seamle drawn can fabricated from rolled al minum sheet.

The new containers are fabricate from aluminum sheet by a draw an ironing process perfected by Kaiser Al minum at its container research an development laboratory in Chicago. this process the cans are given hig strength and brilliant finish. Sidewa and bottom are in one piece, a featu that eliminates the side seam and bo tom closure of conventional cans.

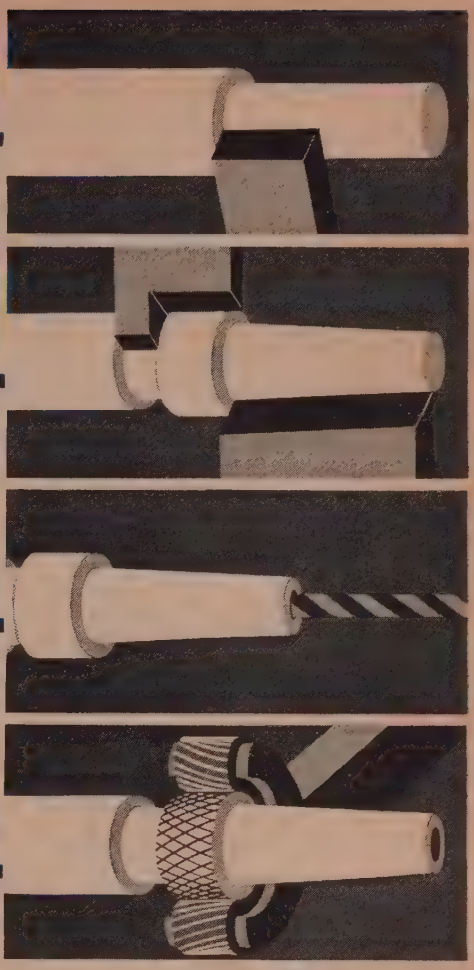
This type of can enables full adva tage to be taken of the properties aluminum for protecting the quality the beer and by providing a stronger c with better surface appearance for mo attractive labeling, the brewing fir said.

Gunther's distinctive red, white a black labels will be printed direc onto the outside of the container wi the reflective surface of the aluminu supplying a bright and attractive ba ground for the design.

D. A. Rhoades, president of Kai Aluminum, said, "Gunther Brewi Company's use of an aluminum can an important step in aluminum's H for a major part of the expanding c and container market." He pointed o that "Kaiser Aluminum is worki closely with can manufacturers in dev oping production techniques which ta full advantage of aluminum's unic qualities in fabrication."

Aluminum's conductivity is an adv tage which permits rapid chilling of

TURN IT FORM IT DRILL IT KNURL IT



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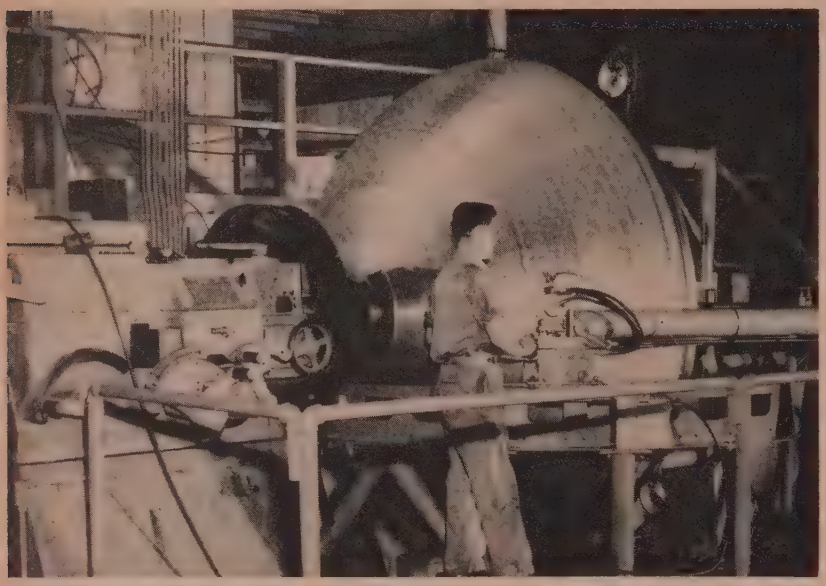
beer. In addition, the aluminum can has easy-opening characteristics. The bottom of the Gunther aluminum beer can nests firmly within the top of the can below it, a convenient feature for stacking. Use of lightweight aluminum will simplify production handling and shipping, it was pointed out.

Within the past year two other U. S. brewers have introduced aluminum-packaged beer. However, the cans are produced by the impact extrusion process from aluminum slugs (see MM, Feb. '59).



Coast Firm Makes Large Spun Parts for Missiles

Missile-Air, Manhattan Beach, Calif., a division of United States Chemical Milling Corp., is now spinning fuel tank heads 105 inches in diameter. The part pictured, one of the largest thick walled vessels ever spun, according to USCM, is a mammoth fuel tank head fabricated for one of the advanced space projects of the Army Ballistic Missile Agency in Huntsville, Ala.

Made of 5086 aluminum alloy, the blank, 7/16-in. thick. This material was selected because of the physical properties that could be obtained through work hardening, as well as for its superior strength at elevated temperatures and excellent welding properties.

The tank head was hydraulically spun and machined to produce the required thickness tolerance. Optimum strength at minimum weight was achieved by leaving heavy areas as required for subsequent attachments by welding.

In the picture, the part is being machined on a special lathe built by Missile-Air. This lathe makes it possible to machine one side relative to the other for wall thickness control. Steps or transitions are as readily machined as on a conventional lathe, but these cuts are made relative to the opposite surface.

Hydraulic tracer controls regulate the cuts but a constant reading electronic system shows at all times the actual thickness being machined, thereby permitting the operator to obtain extremely close tolerances.

Reynolds, Alcoa Make Household Foil Stronger

Reynolds Wrap, the household foil product of Reynolds Metals Co., is to be produced in a new high purity aluminum alloy that will stand up better against ripping, tearing and breaking.

David P. Reynolds, executive vice president, reported that the new foil will be marketed in all weights and seven sizes of the Reynolds Wrap line. All of the company's foil plants will convert immediately to production of the stronger foil.

The new alloy will increase the strength of Reynolds Wrap by more than 50%, Reynolds said. It will be sold at the same price as present foil.

"Tests of the new product, coming on the market 12 years after Reynolds Wrap was developed, indicate that it has greater balanced strength and more body than previous aluminum foils," the announcement said. "It is more than 99% pure aluminum, but the alloying in the remaining fraction of one per cent is the secret of greater strength in Reynolds Wrap."

Reynolds Metals reported that the smooth sheet-foil is being brought on the market as rapidly as possible. Aluminum Co. of America had set July 30 as the debut of its new "super strength" Alcoa Wrap, which Alcoa reports is "up to 104% stronger than any other foil."

Kaiser Aluminum believes that the embossed finish given to Kaiser Foil gives the product a strength advantage and doesn't contemplate adopting a new alloy in the immediate future.

Alumina Refractory Ideal For Aluminum Furnaces

A new 85% alumina ramming mix has been developed by the Refractories Division of H. K. Porter Co., Inc., Pittsburgh 19.

Aluram is recommended for bottoms and lower sidewalls of aluminum melting and holding furnaces because of its high resistance to penetration by molten aluminum and slags. It is also used in malleable iron furnace sidewalls, and rammed electrode sections of electric furnace roofs.

Porter Aluram has several advantages over conventional brick construction the manufacturer reports: It eliminates joints; is strong; and is volume stable eliminating shrinkage, creep and travel.

Aluram can be installed by unskilled labor, and eliminates special brick and mortar inventory. The refractory is made at Porter's Mullite Works, Shelton, Conn., in both heat setting and air setting types.

Ash Trays Designed for Tubular Furniture

Clip-On ash trays are a new product of KelKlip Products, P.O. Box 75[illegible] South Miami 43, Fla. Made of aluminum, the bases are anodized in green, gold, blue and red. The snap-on windproof tops are anodized in silver. Clip-On ash trays were designed primarily for tubular furniture, especially the lawn, pool, patio types.

"They are also used in the marine field, and by paraplegics on portable wheel chairs," said Luther L. Kellogg, president of Kelklip.

Aqua-Bobber Is New Water Sport Item

Looking more like a harbor buoy than a fun contrivance, Aqua-Bobber (shown above) is being billed as "the country's newest water sport sensation . . . fun provoking . . . (and) a source of valuable publicity" — this last, presumably, for the summer resort operators who, it is hoped, will buy it.

Sole product of the Aqua-Bobber Co., 10 River Road, Maumee, Ohio, Aqua-Bobber is a 5-foot, 8-inch diameter, watertight molded fiberglass and resin sphere which has 2200 pounds of concrete inside it for ballast. The mast is a 14-foot, 3-inch diameter aluminum pipe having a ¼-inch wall thickness. Five cast aluminum steps, shaped at the extremities for hand gripping, are spaced up the mast to a welded steel crow's nest. All ferrous parts are plated, the manufacturer reports.

Once the "rider" gains the crow's nest he is ready to begin his "bobbing." Grasping the padded ring around the crow's nest, he begins to shift his weight back and forth, until the Aqua Bobber jobs him into the water. The ballast in the sphere quickly pulls him from the water and back to the opposite end of the arc for another ducking.

Aqua Bobber has a shipping weight of 600 pounds (without that concrete, of course) and can be launched or beached by trailer or boat launching equipment. Price is $1125, f.o.b. Maumee.

Reynolds Makes Big Sale for Railroad Cars

The American railroads might be taking another look at aluminum as a basic construction material for freight cars. Reynolds Metals Co. announced early this month that it would supply 18,000,000 pounds of aluminum plate and extrusions for the production of 1205 railroad cars.

The cars, to be built for the Southern Railway System, will represent the first large volume application of aluminum by the railroad industry, according to David P. Reynolds, executive vice president of the aluminum firm.

He disclosed that 455 cars will be covered hopper cars built by Magor Car Corp., Clifton, N. J., and 750 will be gondola cars manufactured by Pullman-Standard, a division of Pullman, Inc., Bessemer, Ala.

"From the standpoint of the aluminum industry," Reynolds said, "this is a major breakthrough, opening a vast new market for the most versatile of metals."

The order involves 13,800,000 pounds of aluminum plate, 4,400,000 pounds of aluminum extrusions and 500,000 pounds of miscellaneous items. The aluminum firm expects that the entire order will be delivered and fabricated over a four-month period.

Reynolds said that the special design of the cars, geared to utilize to the fullest aluminum's many unique advantages, is the result of close cooperation between all of the companies involved.

He pointed out that Reynolds research and development groups have been developing aluminum railroad applications for many years, and that 14 years ago Reynolds built a number of experimental aluminum box-cars to demonstrate the metal's advantages.

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NEW LOCK SEAM TUBE MILL

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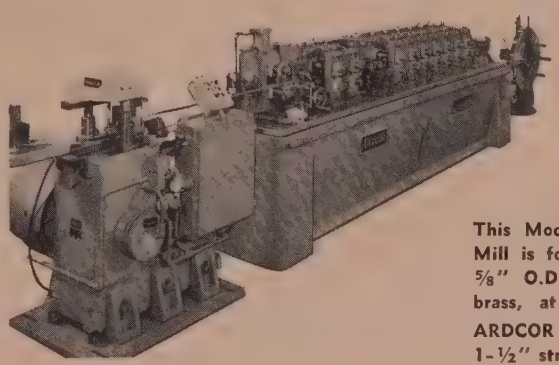

This Model SF Lock Seam Tube Mill is forming TV table legs of ⅝" O.D., .016" wall simulated brass, at 120 f.p.m. Cutoff is ARDCOR Model 10 Press with 1-½" stroke, 60 strokes per min.

The new small Model SF ARDCOR Machine features: High production speeds; roll space 5.5"; spindles 1.5"; new style rugged base with tool compartment and slanted front recessed for better operator stance; special narrow side roll stands with close 10" horizontal centers; fixed spur gears; quiet running all V-belt drive; compact 3-roll straightener; low voltage protection. Basic machine readily converted to a Cold Roll Forming Machine.

ARDCOR Roll Forming Machines and Lock Seam Tube Mills are available in seven standard sizes, other sizes to customer specifications.

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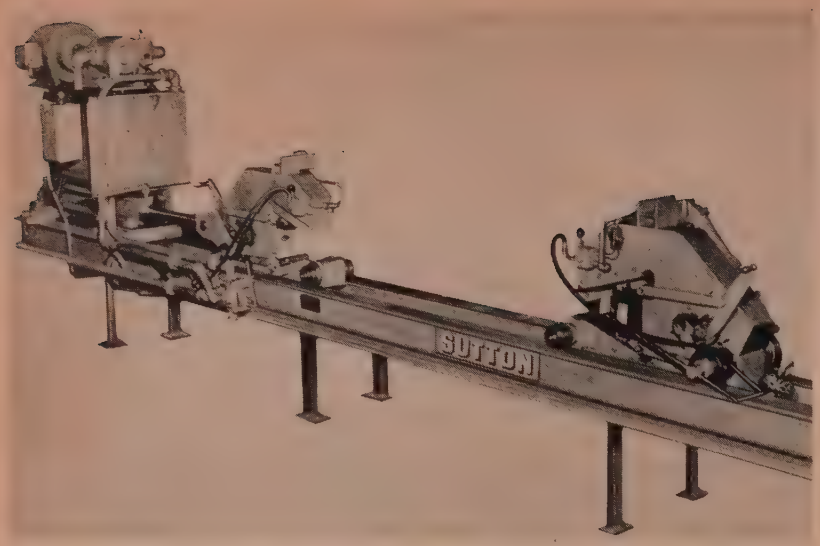


Extrusion Stretcher Handles Shapes Up To 100 Feet Long

A new 20-ton hydraulic machine stretch-straightens extruded sections of aluminum and other metals at high production speeds. Builder is Sutton Engineering Co., Pittsburgh 22, Pa.

Vertical jaw design provides a horizontal pass line through head and tail stock for ease of material handling. Extrusions up to 100 feet long can be stretch-straightened at high rates of production up to a 20-ton pull. At less than 6 tons pressure, speeds up to 400 inches per minute can be realized. Length of stroke of the head stock is 48 inches.

Air-operated jaws are easily interchangeable for different shapes and the tail stock is adjustable for varying lengths. A wide range of different shapes can be handled, Sutton reports.

"To save floor space, the hydraulic unit is mounted on top of the main cylinder," the manufacturer said. "Operation and maintenance have been made simple and positive for heavy-duty production. The new stretcher augments a complete line of Sutton equipment for the faster, more precise production required today."

The Sutton line includes hydraulic extrusion presses, high-speed rotary straighteners, and other processing machines for both the ferrous and nonferrous industries.

Begin Making Lithium Compounds for Fluxes

American Potash & Chemical Corp., Los Angeles 5, Calif., has begun full production at its Henderson, Nev., plant of anhydrous lithium chloride for use in metal products manufacturing and other industrial applications.

A major use of the material is in aluminum welding and brazing fluxes for use in manufacture of aircraft, aluminum cooking utensils, and other aluminum fabrication industries. It is also used in a low temperature salt bath for heat treating of metals as it is an excellent heat transfer medium and prevents corrosion during heat treatment.

American Potash is a leading manufacturer of lithium carbonate for ceramic and glass manufacturing and lithium hydroxide for multi-purpose lubricants and for the Atomic Energy Commission. The company makes other lithium compounds as well as lithium metal, for which anhydrous lithium chloride is the feed material.

Alamet Magnesium Plant Nearing Completion

Plant buildings of Alabama Metallurgical Corp. are rapidly nearing completion in Selma, Ala. With the exception of a few specialists, the entire labor force for this, the second commercial primary magnesium facility in the U. S., will be recruited in the Selma area. The company is owned jointly by Calumet & Hecla, Chicago, with a 70% interest, and Brooks & Perkins, Inc., Detroit.

Magnesium will be produced by the ferrosilicon process, using silicon as a reducing agent, reacted in the form of ferrosilicon with magnesium oxide obtained from burnt dolomite rock.

The rock occurs in Alabama in substantial quantities. Alamet has acquired 58 acres of rich dolomite deposits in Shelby County. According to L. G. White, Alamet president, the potential supply in this area is unlimited.

Other factors influencing the choice of the Selma site, in addition to the proximity of raw materials, included Alabama's year-round mild climate, low-cost fuel and power, labor availability, and location on the Alabama River which one day will be navigable to the plant site.

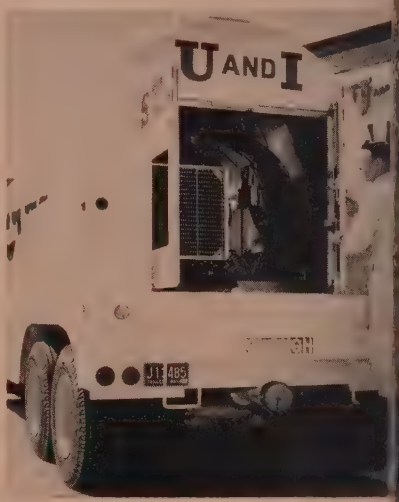
Harvey Extrusions Get New Protective Coating

A new process called Anocote has been developed by Harvey Aluminum, Torrance, Calif., to eliminate superficial corrosion of aluminum extrusions. The Anocote treatment requires "special production operations and metallurgical techniques," according to a Harvey spokesman.

The process protects the metal during routine shipping, storing, and handling operations. Fabricators who anodize or etch their extrusions report that the surface of aluminum treated with Anocote is exceptionally smooth, uniform, and free of defects after anodizing or etching.

Anocote is offered as a company service, enabling aluminum manufacturers to produce a better product, reduce production rejects, and simplify storage practices, the Harvey announcement stated.

The new finish does not alter the natural color of aluminum; may also be used as the final surface of the metal. Initially, the process is being supplied by Harvey on alloy 6063 extrusions only.



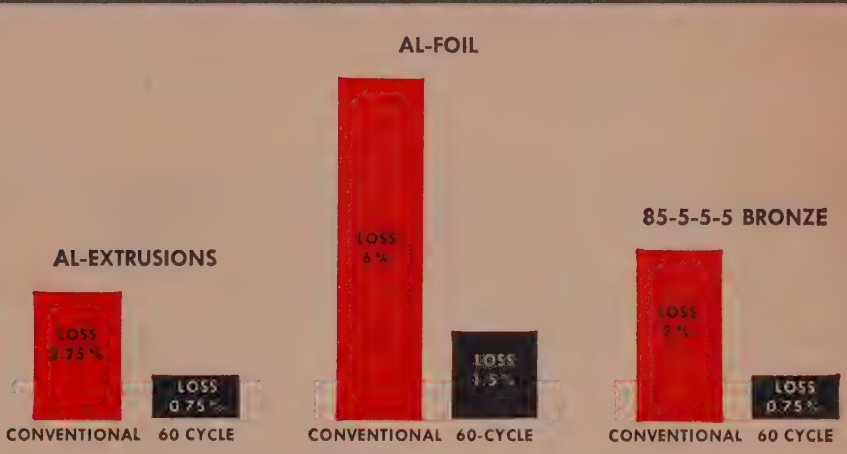
Aluminum Tank A Benefit In Bulk Sugar Transport

Weight savings of nearly 5500 pounds have been achieved by Clough Equipment Co., 2739 Sixth St., South, Seattle, Wash., in the first aluminum bulk sugar carrier to be built in the Pacific Northwest.

The sleek aluminum trailer, fabricated by Clough for U & I Sugar Co., weighs 13,670 pounds empty, compared with 19,000 pounds for a steel trailer of similar design. Load capacity is 40,000

60 CYCLE INDUCTION MELTING SAVES Metal and Money

METAL LOSS REDUCED



A sharp cut in metal losses is inherent in 60 CYCLE INDUCTION MELTING. Unnecessary metal losses in a furnace can amount to many thousands of dollars per year. Here are three examples of what AJAX 60 CYCLE INDUCTION furnaces have done for others:

ALUMINUM EXTRUDERS: Typical experience of manufacturers of aluminum extrusion billets using AJAX-TAMA-WYATT 60 CYCLE INDUCTION furnaces is a metal loss of 0.75% as compared to 2.25% in conventional fuel fired furnaces. (Based on a charge containing 30-40% extrusion scrap.)

ALUMINUM FOIL MILLS: 60 CYCLE INDUCTION MELTING furnaces are widely used to melt foil scrap and other finely divided materials. Operating reports show a reduction from 6% metal loss in conventional furnaces to 1½% in the coreless AJAX-JUNKER furnace.

BRASS AND BRONZE FOUNDRIES: AJAX melting furnaces are standard in all brass millcasting shops, because metal losses with other methods are prohibitive. More recently, special AJAX-TAMA-WYATT furnaces have been applied widely to 85-5-5-5 bronze casting. Here the metal loss is under 1%, as compared to 3% or more in externally heated furnaces.

IN ALL THESE CASES, SAVINGS PAID FOR THE EQUIPMENT IN LESS THAN TWO YEARS.

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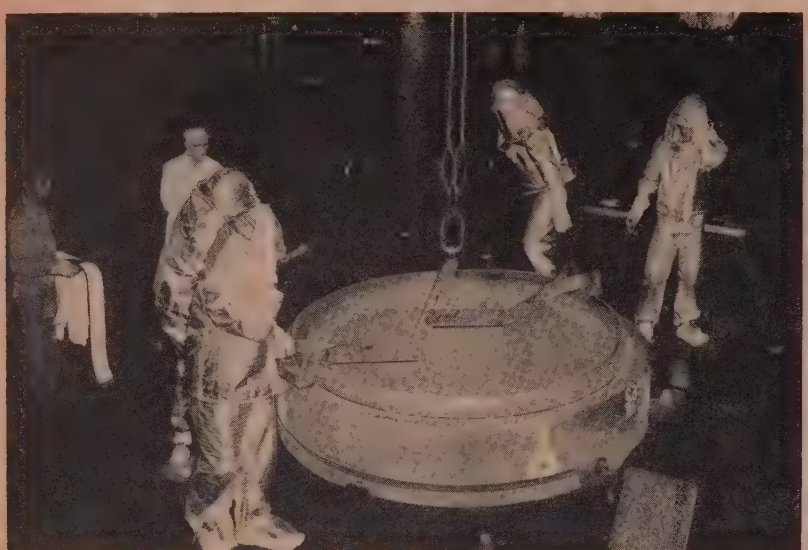
pounds. The trailer will serve industrial users of sugar in the Oregon-Washington market.

A major advantage of the aluminum design is that carrying capacity of the trailer is up to 10% greater than a comparable steel vehicle. A second advantage is that no interior coating of the aluminum tank is necessary (note picture), eliminating the usual requirement of periodically sand blasting and recoating interior surfaces, according to Kaiser Aluminum & Chemical Corp., suppliers of the metal.

Clough's design includes a blower unloading system which operates at a pressure of 7 psi and can convey sugar several stories high into customer's bulk storage facilities. Pressure tests to 28 psi have been made without leak or failure. Adding to versatility in unloading is a conventional gravity system.

Constructed of alloy 5086, a high strength weldable alloy developed by Kaiser Aluminum, the trailer has completed road tests and is joining a fleet of three aluminum trailers operated by U & I in the Pacific Northwest.



Beryllium To Have Vital Role in Manned Space Flight

A huge, dished beryllium circle will be the heat shield used in the space capsule now being built by McDonnell Aircraft Corp. for the U. S. Government's manned orbital flight program.

During the rocket ride from a Cape Canaveral launching pad to outer space the shield will form the outer covering of the capsule floor. When returning to earth, it will be the chamber's leading face. The extremely light and tough beryllium shield will store and dissipate the intense heat generated when the capsule, after circling the globe in outer space, re-enters the earth's dense atmosphere while traveling at 18,000 miles per hour.

Brush Beryllium Co. and Aluminum Co. of America collaborated in producing the shield. Brush produced the record-size, 62-inch diameter billet, using its patented QMV process involving simultaneous application of vacuum, heat and pressure to beryllium powder.

Following preliminary machining by Brush, the billet was encased in steel for the high-temperature forging operation at Alcoa's Cleveland works.

The billet was heated to about 2000°F. in a special furnace designed and built by Alcoa. A huge manipulator then removed the glowing, steel-jacketed beryllium piece and placed it on a preheated die in a 50,000-ton forging press operated by Alcoa under the Air Force Heavy Press Program. This produced a saucer-shaped disc, 80 inches across and three inches thick (see photo).

The beryllium disc was then returned to Brush for precision finish machining to 72-inch diameter. Alcoa performed the final operation — ultrasonic inspection — before shipping the shield to McDonnell Aircraft for installation in the National Aeronautics and Space Administration's Project Mercury capsule.

NASA said that after a testing program is completed an effort will be made to place the manned capsule in orbit slightly more than 100 miles above the earth. It will be fired into space by an Atlas ICBM, and if the shot is successful, will send the capsule in a 90-minute globe circling flight.

Following the third circuit of the earth, a ground control station will cause the capsule to be slowed in its flight, dropping it from its orbit back into the atmosphere. The heat shield performs its most vital function durin this stage of the flight.

At an altitude of 10,000 feet, a larg parachute will open to lower the cap sule to a recovery area pinpointed in th Atlantic missile range.

Pittsburgh Rolling Mill Company Gets Big Order

Pittsburgh Engineering and Machin Division of the Pittsburgh Steel Foundr Co. will build a 66-inch four-high alu minum breakdown mill for Anacond Aluminum Co., a subsidiary of th Anaconda Co. The Division report that it's the first big order since i became a part of the Textron Organiza tion.

The mill will be built in the Pitts burgh Engineering and Machine plan in Glassport, Pa., near Pittsburgh. Alber C. Fisher, vice president of the engi neering concern, reports that desig features will include hydraulic rol crown control, special reel drives t provide added flexibility, an x-ray fo automatic gauge control, and other im portant design features.

The aluminum strip produced wil have a minimum thickness of .012 inc and a maximum width of 60 inches. I will be rolled at a speed of 1200 fee per minute. The mill is scheduled fo operation in February, 1960.

This order represents the larges expenditure of a $2.5 million expansion program to increase production of alu minum strip at Anaconda Aluminum' Terre Haute, Ind., plant, P.E.&M. re ported.

Stetson Makes Hats That Twinkle

John B. Stetson Co. is now marketin black and brown fedoras which twink with subtle touches of Reymet alum num yarn. The black hat is flecked wi silver Reymet, the brown with gol colored aluminum yarn.

"The hats exemplify the great varie

potential uses Reymet staple has as decorative fiber," said Robert F. ewis, textile market manager for Reylds Metals Co., makers of Reymet. Easy blending is possible with Reymet iple, and a subtle touch of elegance n be obtained inexpensively with e yarn," he adds.

Introduced by Reynolds in 1957, Reyet staple was the first workable short etallic fiber and is now available in idths as narrow as one-220th of an ch and in a full range of colors.

larvey Extrudes Widest Shape'

A 28.08-inch wide extrusion, described "the widest aluminum section extrudd flat," is being produced on a 12,000-n press at the Torrance, Calif. plant Harvey Aluminum. The integrally iffened shapes are extruded in alloy 78 on a production basis for subseient machining into structural wing mponents, the Harvey annoucement ated.

A special technique developed by Hary is used to extrude the extra-wide ape, the company reported.

"By producing the part flat, we are le to hold closer tolerances and main-in optimum cross-sectional uniformy," a Harvey engineering director id.

"On the big presses we can extrude uminum structural shapes comparable the largest fabricated steel sections, ith the added advantages of better rength-to-weight ratio, custom design, wer fabricating costs, and excellent rrosion resistance."

Some of the newer uses for Harvey's g aluminum extrusions are curtain alls, ship decking, truck-trailer secons, airframe parts, missile bodies, elicopter blades, bridge and highway nstruction, pipelines, and materials andling equipment.

Sea Water Could Be Future Source of Aluminum

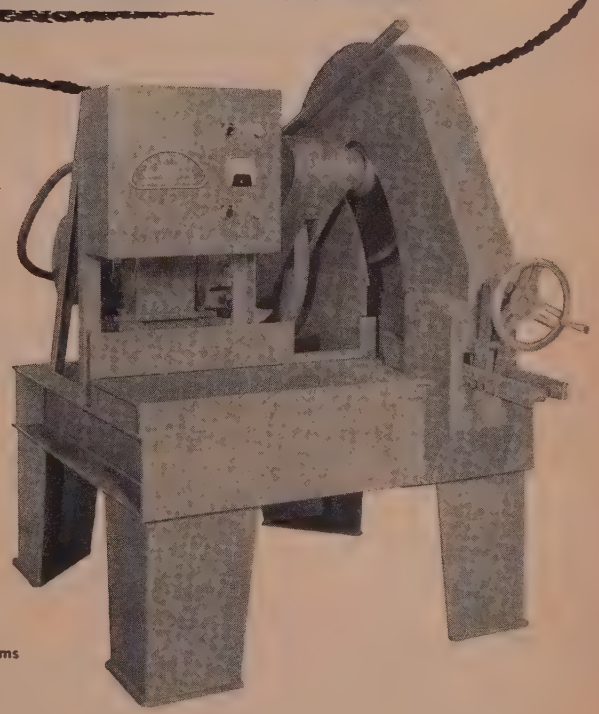
A revolutionary method of extracting minerals from solutions has been invented by a university professor in South Africa. It may provide a low cost system of recovering metals from seawater, according to Armour & Co., Chicago, who have filed patent applications for the process in the U. S. and 31 other nations.

The process, invented by Professor Felix Sebba of the Witwatersrand University, Johannesburg, South Africa, has not reached the commercial stage. An Armour spokesman said that it was too early to comment on its application.

Sebba found that certain soaps, when added to a mineral-bearing solution, would chase the mineral to the surface after bubbles were blown through the water. He demonstrated this with a cobalt solution to which he added potassium laurate. Bubbles blown through the water immediately produced a green froth containing cobalt.

"I have calculated that it should be possible by this method to extract 600

New 30HP "CHOP" Saw Ends UNDERPOWER Problems



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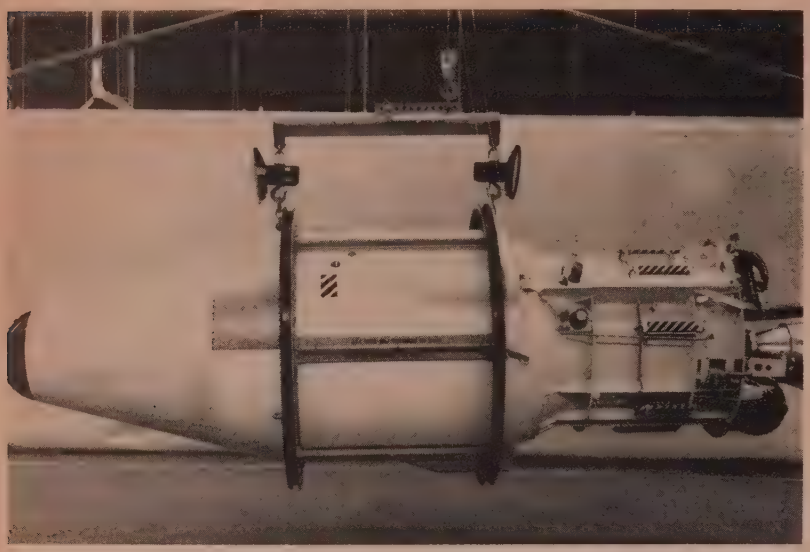
tons of aluminum a day from the sea, or two tons of uranium, or 240 ounces of gold," Sebba commented. "I visualize a small sea area fenced off, with pipes laid on the ocean bed for introducing bubbles into the water after adding the required soaps. The minerals could then be collected on the surface."

Which mineral is driven to the surface would depend on the soap used.



Satellite Has Large Quantities of Magnesium-Thorium Alloys

The four Discoverer satellites fired to date from Vandenberg Air Force Base, Calif., each contained more than 600 pounds of magnesium-thorium alloys. The total weight of each vehicle ranged from 1300 to 1700 pounds.

The satellite's skin and fairings are fabricated entirely from HM21A-T8 magnesium sheet in gauges of 0.071 to 0.143 inch, rolled to a tolerance of ±0.002-inch to hold weight to the specified minimum. Length of the vehicle, including the second-stage Bell liquid propellant engine, is 18.8 feet and diameter is five feet.

Discoverer is pictured here with aft-section skin fairing removed to show the rocket motor.

According to Lockheed Aircraft's Missiles and Space Division, Discoverer satellite prime contractor and system manager, magnesium HM21A-T8 was selected for its ability to withstand high aerodynamic heating and the wide temperature variations when the vehicle passes in and out of the earth's shadow and for its resistance to compressive buckling. The Dow Chemical Co., producer of the alloy, reports that the material is serviceable to about 900° F.

About 20 different extrusions in another magnesium-thorium alloy, HM31A, are also used in the Discoverer. The vehicle also uses many magnesium-thorium castings (HK31A-T6) and forgings (HM21A-T5).

Kaiser Marketing Sheet With Built-In Gold Color

Nonfading gold-colored aluminum sheet, a development of Kaiser Aluminum & Chemical Corp., is now a standard product in a broad range of sizes and embossed finishes.

Designated Number 80 Architectural Sheet, the product differs from other gold-colored aluminum in that the color is inherent in the alloy itself, rather than achieved through the use of dyes. The color is brought out by anodizing under controlled conditions using standard anodizing equipment and techniques.

It imparts a sunfast gold color and provides excellent color matching by eliminating the uncertainties that occur with dyes or other coloring agents.

The product has been under extensive development and testing for several years by Kaiser's Department of Metallurgical Research. As part of this program, it has been applied to selected buildings including the Kaiser Center which is nearing completion in Oakland, Calif., as world headquarters of Kaiser Aluminum and other Kaiser companies.

Number 80 Architectural Sheet is available in any of the company's standard embossed patterns in flat or coiled sheet form, in widths up to 60 inches depending on the embossed pattern, in thicknesses from .060 to .125 inch. and in tempers H-114, H-134, H-154 and H-174.

Punched Cards Raise Rolling Mill Efficiency

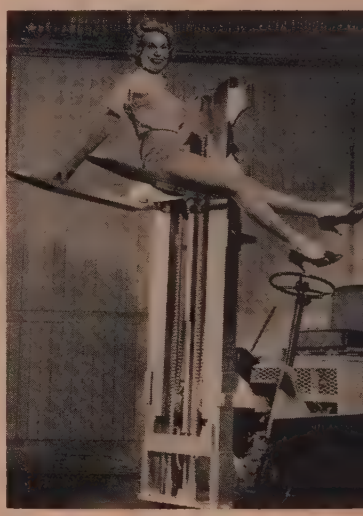
An automatic system that follows structions punched on IBM cards est lishes mill speed and roll openings plate rolling operations at the Dav port, Iowa works of Aluminum Co. America.

On conventional mills, controls moved manually to operate the scr down to set distance between rolls new, smaller setting is required for e pass of the slab until it reaches its dered thickness and width.

Now Prodac, Westinghouse Electr card-programed system, does the j allowing the mill operator to conc trate on the passes of the slab with having to worry about the roll setti

To work a billet, a single IBM c containing mill speed and roll sett for each pass in the rolling sched is placed in a card-reading unit. Wh the starting button is pressed the rea translates the data in electrical pulses that order the screw-down position the rolls for the initial p

The card reader sets the mill sp and indicates mill direction and p number to the operator. The opera then completes the pass manually. T procedure is repeated until the fi pass has been made.



This Lift Truck Has New Application for Aluminum

Aluminum's combination of streng and light weight is illustrated in t prototype fork lift truck recently t veiled by Lamson Mobilift Corp., Po land, Ore.

Designated model B-224, the unit e ploys an aluminum mast and carri — the first ever offered on any lift tr — which weigh only a third as mu as those constructed of other materi The mast, with a collapsed height 68 inches, is the first Mobilift mast e offered in keyed-and-bolted, rather th

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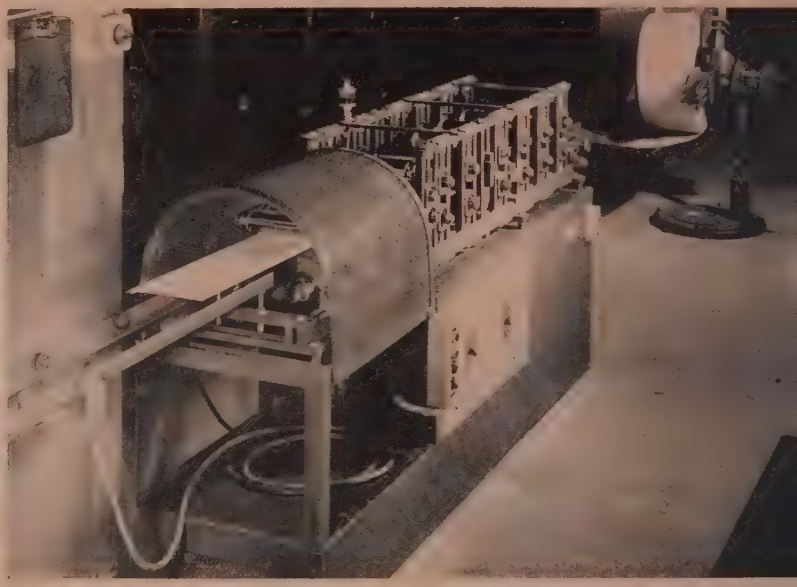
welded, design. Special rollers are used between mast sections to carry side thrust pressure. Maximum fork height is 137 inches.

Lamson Mobilift said the model will undergo exhaustive tests before bein placed in production as a standard item Technical assistance in aluminum appl cations was provided by Reynold Aluminum Supply Co.



New Rollform Line Aimed at Home Improvement Field

A new aluminum siding production line, designed by Arnold Metals & Machinery, Inc., 596 River Road, Clifton, N. J., is said to be "engineered for high speed, competitive production at a fraction of the former cost."

"Not only does this new roll forming line produce eight-inch aluminum siding competitively, but it does so in a minimum of space," Arnold A. Wasserman, president of the company, reported.

The Arnold program encompasses the sale of rollforming lines to franchised manufacturers who pay for the equipment over a 36-month period. The machines are spotted in sound marketing areas and are serviced continuously by trained personnel, according to the com pany.

In addition to supplying the ma chinery and service, the Arnold organi zation supplies the pre-coated aluminun strip and siding accessories to its manu facturers.

"We sell them the unformed alumi num and accessories at competitiv prices which enables them to distribut siding in volume at the wholesale level, an Arnold spokesman said.

Wasserman said that a merchandisin and sales promotion program helps sel the product through existing and ne outlets in the home improvement ir dustry and several other areas of di tribution.

Miami Fabricators Fight Loss of Freight Allowance

Aluminum fabricators in Florida's Dade County (Miami) area are making a concerted effort to have their freight allowances restored by the major aluminum producers. These allowances, which often amounted to discounts off the price of metal, were discontinued July 1.

Under the old system, a fabricator who picked up his raw aluminum in his own trucks was reimbursed to the amount that the supplier would have paid the common carrier who delivered the material. Many users in the Miami area took advantage of the system by having their own truck-trailers pick up the metal on the return trip from the North. It added up to a sizable saving.

But then Kaiser Aluminum announced that effective July 1st, all shi ments (except forgings) would be o an "f.o.b. destination" basis within t continental U. S. Under this syster the customer pays the quoted price f metal delivered to his door; the pr ducer picks up the tab for freight ar assumes responsibility for claims f damage or loss of merchandise.

In effect, all customers pay the sam price. But the producer's net varies, d pending upon the shipping cost fro the mill to the customer's plant.

The other producers quickly follow suit, one of them explaining that "w think this is the fairest and best way eliminate inequities."

Understandably enough, the Flori

ms preferred the old system. They aped a substantial saving by having aw aluminum picked up by their own ucks which had delivered finished win-ows, doors, jalousies, furniture or other luminum products to distributors up orth.

Arising to meet this threat, 30 of ese manufacturers have formed the lorida Aluminum Window and Door lanufacturers Association. A committee eaded by S. H. Vuncannon, president f the association and an officer of usco Windows, Inc., has urged the roducers to reinstate the freight allow-nce system. Prospects of this happening eem dim, at best.

Vuncannon said that freight allow-nces for metal bought and picked up y customers' trucks at aluminum sup-liers' plants in Illinois, Ohio, Pennsyl-ania, West Virginia, Tennessee, Arkan-as and elsewhere were an important actor in competing with northern anufacturers who are "closer to the ources of supply.

"The Miami manufacturers built their usiness on this freight allowance," he ontinued. "Without it, we can't com-ete with northern manufacturers."

The association is reported to be con-idering legal proceedings, possibly anti-rust action. A Kaiser spokesman scoffed t this.

"We made this move on our own," he said. "Other suppliers elected to follow suit and for understandable reasons, considering the abuses practiced by some customers."

An Alcoa spokesman said the freight allowances were dropped as "a move to stabilize aluminum prices" and that they had given rise to "all sorts of abuses," and in some ways discriminated against other Alcoa customers. Eliminating the allowances, he said, "is an effort to be sure no customer is at a disadvantage because of the location of his plant."

Alcoa and Kaiser spokesmen cited practices of a fabricator picking up metal at a supplier's plant and delivering it to an intermediate point between that plant and home base, but claiming the full freight allowance nevertheless.

Another abuse cited was the purchase of pig or ingot at what amounted to the discounted price and resale to another company at below the published price — sometimes en route home.

Veteran observers point out that many a Florida aluminum firm was established on this unsound basis, figuring that between the freight allowance, the low cost of Florida labor, and highly elastic credit terms, northern competition would be no problem.

For some aluminum customers another threat is attached to the cancellation move. The economics inherent in full trailer loads going and returning had led to the purchase of expensive truck-trailer fleets. Under the new system these vehicles could become serious liabilities.

Aluminum Stars In Cartons for Cokes

The Rockford Model aluminum carton for Coca-Cola has been renamed the Reynolds Aluminum Carton and will be sold exclusively by Reynolds Metals Co., the company has announced.

Made by the J. L. Clark Mfg. Co., Rockford, Ill., the bottle carrier is made of .025" ribbed aluminum and

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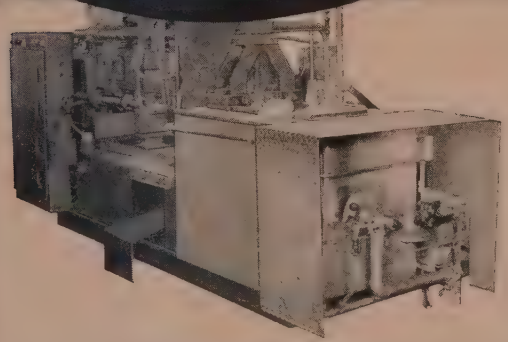

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has a heavy gauge wire handle that slides up and down for easy carrying or stacking. The carton is available in 6-bottle and 12-bottle models.

The aluminum carton has more merchandising appeal and is less expensive to use than other types of bottle cartons, according to S. H. Garnett, manager of Reynolds beverage packaging market. It is the forerunner of other developments in multiple-bottle beverage packaging such as all-aluminum bottle cases, he added.

"Because of the carton's long life, many Coca-Cola bottlers have found it much more economical to use than other types," Garnett explained. "Several bottlers are still using aluminum cartons purchased in 1948, the year they were introduced."

The cartons' sturdiness permits use of a less expensive case and their strength and rigidity help reduce bottle breakage. They are washable for complete sanitation and cleanliness. Their bright, clean look encourages impulse buying. They are free-standing, can be built into eye-catching display islands of any size, interlock for greater safety and strength, and have a replaceable name plate insert which can be used for special promotions.

Roll-Bond Evaporators Used in New Pan-Am Jet Clippers

Refrigeration systems utilizing aluminum Roll-Bond tubed sheet are important components of the new food and beverage service buffets installed in Pan American World Airways' new jet clippers which will be placed in service later this year.

The unique material, used in many "heat exchange" applications, allows a designer to create intricate patterns of tubing within a single homogeneous sheet of metal. The result: Compact "kitchens in the sky" which permit the preparation of complete meals in limited space.

Manufacture of the buffets starts at the Roll-Bond products plant of Olin Mathieson Chemical Corp. at East Alton, Ill. Here, evaporator plates are manufactured and prepared for assembly. They are then shipped to the plant of Dale Sales, Inc., Los Angeles, who produce the refrigerators for Pan American.

This company ships the units to Nordskog Co., Inc., Van Nuys, Calif. and REF Mfg. Co., Mineola, N. Y. Nordskog, world's largest manufacturer of airline food service equipment, produces galleys for Pan American's 707 Jet Clippers. REF Mfg. Co., which produces a complete line of in-flight food service equipment, is supplying Skygalleys for Pan-Am's DC-8 Jet Clippers.

Two galleys are installed aboard each plane. Each galley has two buffets which contain 30 cubic feet of storage and refrigeration space. The 19.3 cubic foot refrigeration unit in each buffet has a capacity of 48 meal trays. Each galley has more than seven square feet of counter space.

Anthony Fiori, chief engineer of REF Mfg. Co., estimates that the DC-8 galleys which his company is producing weigh about 420 pounds, of which 330 pounds are aluminum components. Since two galleys are installed in each plane, a total of 660 pounds of aluminum is used for the kitchen equipment alone.

In the photos, finished evaporator plates are shown being flushed internally to remove all traces of stop-weld material (left); and Pan American stewardess Gisela Wright removes a meal tray from the refrigerator aboard a Boeing 707 Jet Clipper.

Reynolds International Given New Status

Reynolds International, Inc., overseas manufacturing and sales arm of Reynolds Metals Co., has been set up as a separate unit with independent management.

The board of directors, in announcing the move, said it was taken in recognition of the growing importance of the firm's stake in world markets.

The board named J. Louis Reynolds as chairman and chief executive of Reynolds International. Mr. Reynolds resigned his position as executive vice-president of Reynolds Metals Co. to devote full time to the expanding international interests of the firm. He will reside abroad. W. G. Reynolds will continue as president of Reynolds International, but will be based at the firm's Richmond, Va. headquarters.

Reynolds International has a 47% interest in The British Aluminium Co., Ltd., and interests in Canada, Mexico, Cuba, Colombia, the Philippines, Germany, and Ireland.

"The importance of world markets to the American economy and to American manufacturers is growing daily," chairman Reynolds said. "There is no question that a great potential exists for the use of aluminum in other countries. Per capita use of aluminum in this country is 21 pounds per year; in Western Europe and Canada, the average is only 6.2 pounds and for the rest of the world 0.7 pounds."

New Sailboat Class Has All-Welded Hull

General Boat Corp., Grand Prairie, Texas, has introduced a new 20-foot class of sailboats having welded hull.

The new "Flying Feather" class boat have an over-all weight of 375 pounds and a sail area of 165.3 square feet. Aluminum alloy 5050, well suited fo

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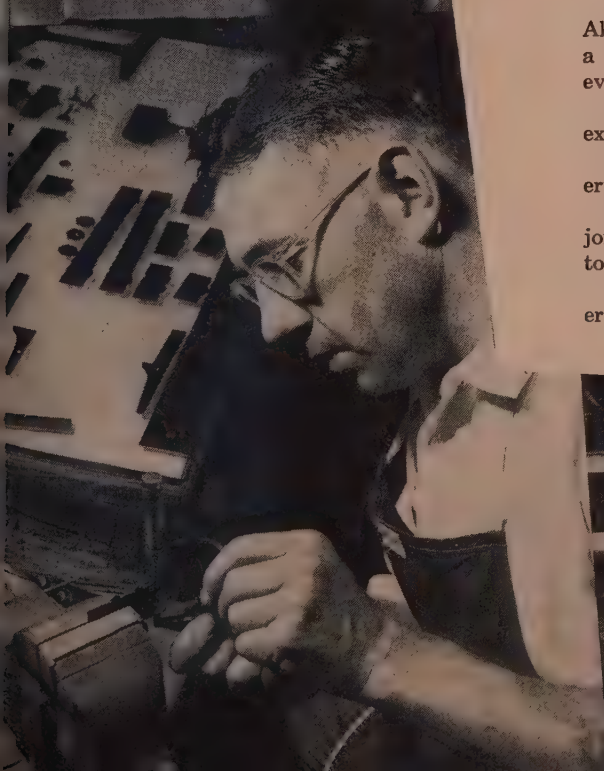

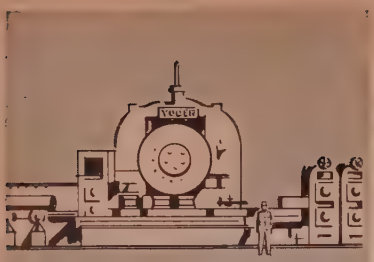

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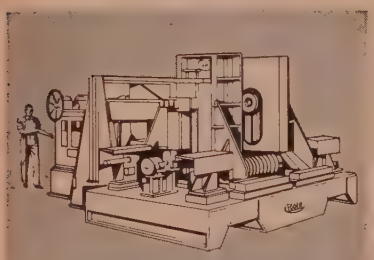
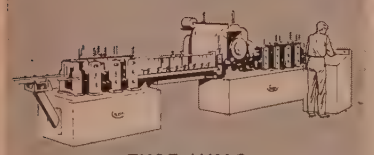


HEAVY DUTY UNCOILERS



TUBE MILLS

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marine applications, is used in the hulls. The heavy gauge sheet is welded with alloy 5356 aluminum welding wire.

Dagger boards are formed with ¼-inch aluminum plate. Rudders are fabricated from aluminum sheet filled with expanded plastic foam for floatation. Hollow aluminum extrusions with integral sail track are used for the mast and boom with running rigging inside the mast.

The Flying Feather line boasts a 10-foot by 4-foot cockpit area and has a draft of 4½ feet with the daggar board down. The mast measures 25 feet when stepped.

Joe E. Hannon, president of General Boat Corp., said that "the Flying Feather promises to be a very popular racing class. The new aluminum boats are fast and roomy and make a fine family sailboat as well as a challenging new racing craft." Hannon is class secretary.

An aluminum trophy will be presented by Kaiser Aluminum to the high point winner of this class during the 1960 racing season.

Aluminum Output Begins At Reynolds' New Plant

Start-up of the first of three potlines at its new St. Lawrence reduction plant near Massena, N. Y., has added approximately 33,000 tons to the primary aluminum production capacity of Reynolds Metals Co.

V. G. Kneeskern, plant manager, said the operations bring Reynolds to an annual production level of 634,000 tons. The company will have an additional capacity of 67,000 tons at Massena by the end of the year, he added.

Indications are that about one-third of the St. Lawrence plant's annual production will be delivered as molten metal to a Chevrolet foundry nearing completion close to the Reynolds plant. The remainder of the metal will be sold in pig or ingot form.

Chevrolet trucks will pick up the molten metal in crucibles (see above). Entering the crucibles at about 1,780°F the aluminum would remain molten for several hours. A short roadway connects the two plants.

Reynolds has been supplying metal to the Chevrolet plant for pre-production tests for several weeks.

Magnesium Wrought, Cast Products Shipments Rise

Shipments of wrought magnesium products totaled 2845 tons in the second quarter this year, exceeding any quarter of the past two years, the Magnesium Association reported. Primary magnesium production also registered a gain, attributed to a stepped-up schedule at Dow Chemical Co.'s Freeport, Texas, plant.

Wrought products shipments totaled 1045 tons in April, dropped to 822 tons in May, then rebounded to 973 tons in June for a 10% gain over first quarter shipments. First half total was 7% ahead of the last half of '58.

Primary magnesium ingot production of 2787 tons in June was up 4% from the May figure. Second quarter production of 7254 tons exceeded the first quarter mark by 31%. First half production of 12,781 tons ran 16% ahead of the last half of '58.

The Association also reported the

ipments of magnesium castings for ay were 4% to 1177 tons from the 231 tons shipped in April. All of the cline resulted from a sharp drop in nd casting shipments which totalled 5 tons, the lowest since January 1958. rmanent mold, anode and die cast- g shipments all registered small gains. Increases for the first five months of 59 in shipments of permanent mold id die castings suggests that a much ore satisfactory annual volume is aping up for these types. Die casting ipments through May are about 80% ead of the same period last year; ermanent mold shipments are running 5% ahead of last year.

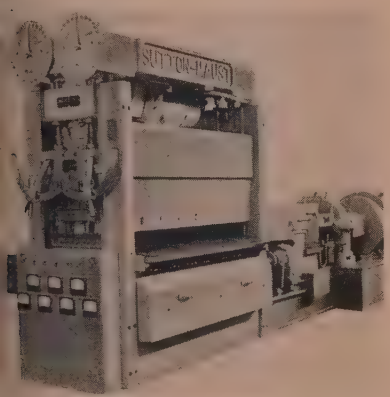
New Welding Wire Suitable for High Tensile Alloys

A new addition to the line of aluminum filler wire for use with the Airco-matic (gas-shielded metal-arc) and Heli-weld (tungsten-inert-gas) welding processes has been announced by Air Reduction Co., New York 17.

Designated type A5556, this aluminum welding wire was developed to weld high strength aluminum alloys such as 5083, 5086 and 5456 that are used in the construction of missiles, ship superstructures, truck frames, storage tanks, gun mount bases and diesel engine bases.

The wire can be employed in all types of structural aluminum fabrications where post heat treatment is not feasible as a method of producing high strength welded joints.

This magnesium-aluminum wire is available in Type "A" finish. It has been cleaned and specially treated to produce a consistently uniform surface, Airco reports.



Levelers Provide Precision Flattening

Sutton Engineering Co., Pittsburgh 22, Pa., has introduced a complete line of Sutton-Maust roller levelers for ferrous and nonferrous sheet and strip, including tension leveling of coil stock. All sizes are made for all modern metals of any required width and in thicknesses from .001 to .750-inch.

An important feature of the equipment is the Maust patented, double-tilt, backed-up roll arrangement which provides precision flatness and better correction of mill shapes than can be obtained in any other way, the company points out.

In this design, the work rolls are cradled by multiple banks of adjustable back-up rolls. The top work rolls are arranged in a symmetrical pattern with the entry and exit rolls adjustable for upward tilt. The entry rolls subject material to gradually increasing waves; the centrally located roll group produces a series of uniformly deep waves for maximum correction; and the exit group completes the flattening process.

The double-tilt design enables the material to be reversed in process at any time, without adjustment. Because work is funneled into the machine at the tilted ends, burnish marks caused by more severe entry conditions of other equipment designs are eliminated. No pinch rolls are needed.

The multiple banks of back-up rolls are individually adustable so that localized pressure can be exerted to any portion of the sheet to remove mill shape from the material. They are pivotally mounted to conform with work roll deflection patterns. Design of the back-up roll arrangement prevents work roll markings.

Sutton-Maust double-tilt levelers may be used in process lines, cut-to-length lines, or tension leveling lines. Motorized adjustments permit remote control in processing lines. Tension leveling makes possible precision flattening of thinner stock and a wider range of gauges and materials.

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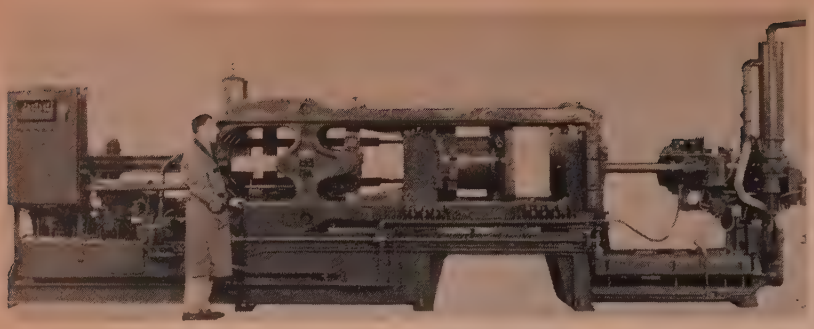


New Die Casting Machine Designed for Deep Draw Parts

A new aluminum die casting machine design that offers twice the die opening of any machine with comparable tonnage, has been introduced by Lester-Phoenix, Inc., Cleveland 13, Ohio. This new model, called the HP-450X-SF, delivers 450 tons of clamp, certified by strain gage tests, while providing a die opening stroke which is adjustable from 8 to 30 inches.

The new machine will produce deep draw aluminum parts such as rotors with long shafts, washing machine agitators, and automotive transmission housings weighing up to 16 pounds.

This machine incorporates the Lester pre-fill injection system, which combines high initial speed with high final impact to provide "super-dense die castings with fine surface finish." The pre-fill system is used with a nitrogen accumulator for highest initial shot speed.

The stroke of the injection plunger is 17½ inches. The injection shot end of the machine is adjustable from center to 6 inches below center, with the height controlled by a hydraulic elevating device. The support bars of the injection end are level for automatic ladling adaptations. Both the shot pressure and shot speed are adjustable.

The 450 tons of pre-load clamping is made possible by the one-piece alloy steel frame with its enormous beam area, equal to the full diameter of 7¼-inch tie bars. This solid, precision-finished frame also insures permanent, parallel alignment of the platens. Die setup is a simple operation because o the single hand crank die height ad justment.

Die height is adjustable from 30-inch down to 8-inches with aid of 3-, 6- an 9-inch spacer rings, with a total da light of 60-inches. The complete m chine cycle at the 8-inch opening ad justment is 6.7 seconds, and at the 3 inch adjustment only 8.5 seconds.

The unobstructed movable platen 38-inches wide and 40½-inches high with a vertical clearance between th beams of 27-inches. A 25 x 91-inch open ing at the top of the frame makes th die space accessible from all sides.

The locking mechanism is rigid dou ble toggle in multiple shear, to giv solid backing to the die. There ar hardened steel bushings throughou The hydraulic system allows die spee control.

The pumping system of the "450X uses a 30-HP motor and includes 2000-lb. booster pump. Completely ex posed hydraulics and flanged, mounte valves meet J.I.C. standards. Time casting ejection is provided by the cen tral hydraulic ejector with force up t 30 tons. Hydraulic core-pull headers ar optional equipment.

Dow Division to Fabricate Magnesium, Other Metals

The Dow Chemical Co. has forme a new division for the fabrication an semi-fabrication of magnesium, alum num and other metals.

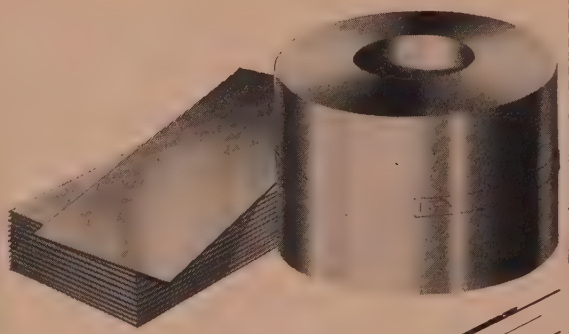
The Dow Metal Products Co. wi replace the Dow Magnesium Produc Department, according to Dr. Leland Doan, president of Dow Chemical. Th new division was formed to facilitate broad departure from the company previous role in the metals field, he ex plained.

Although there will be no letup i Dow's development of magnesium which the division has concentrated o since 1915, diversification to includ other metals will not be on a tempo rary basis, Doan added. The long-rang aim is to work with any metal that show promise of increasing the division earnings.

President of The Dow Metal Produc Co. is Hubert Fruehauf, who was ma ager of the former Magnesium Produc Department. Dr. J. Donald Hanawa is vice president. Herbert H. Lyon manager of Dow's sheet and extrusio mill at Madison, Ill., is vice presider and chief financial officer. Donald E Gilmore, who headed the former Ma nesium Products Sales Department, vice president and sales manager. Ar thur W. Winston, Sr., is assistant to th president and secretary of the compan

Serving with these officers on th board of the new company are A. J Peters, manager of Dow's magnesiu

ALUMINUM coils and sheets



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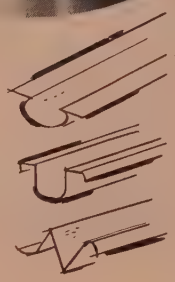

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erations in Bay City, Mich., and arles E. Nelson, who also is technical ector.

Production and sale of primary magsium and magnesium-alloy ingot will ntinue to be handled by the parent npany through its Texas Division at eeport, Texas, and Magnesium Metal les Department at Midland, Mich.

culpture Presented o Architectural Firm

As a lasting reminder of its achievent in winning the 1959 R. S. Reyolds Memorial Award (see MM, July, 9), the Australian architectural firm f Yuncken, Freeman Brothers, Grifths and Simpson was presented this ast aluminum sculpture. A $25,000 honrarium was included in the award.

The sculpture, called "Herald," was xecuted by Seymour Lipton (pictured), nder commission from the trustees of he award which is made every year by he Reynolds Metals Co. for creative rchitecture in aluminum.

Bureau of Mines Describes New Magnesium Research

Studies are under way at the Rolla, Mo., research station of the Bureau of Mines to develop magnesium alloys with three or more components, which will have new uses or improved service characteristics.

The Bureau will continue a comprehensive review and analysis of damping capacity of commercial magnesium alloys, as well as new alloys, in various semi-fabricated forms. Laboratory work will include research on the relation of heat treatment to physical properties of the new alloys.

Also planned is an intensive evaluation of magnesium production processes to determine the course of future research in developing improved production techniques. The Boulder City, Nev. laboratory has this project.

Five-Fold Expansion Planned for Fairmont Aluminum

A plan is underway to expand productive capacity of Fairmont Aluminum Co. almost five times, according to Cerro de Pasco Corp., the parent company.

The plant at Fairmont, W. Va. now has a rated annual capacity of 25,000,000 pounds of finished aluminum coil and flat sheet products up to 36 inches wide. At an initial cost of $10 million, this capacity will be raised to 66,000,000 pounds of sheet up to 60 inches wide.

A subsequent expansion program has the goal of 120,000,000 pounds, according to Robert P. Koenig, president of Cerro de Pasco. Koenig said that the corporation's board of directors have decided that Fairmont should "take a more prominent part in its industry."

Robert T. Farrell, Fairmont president, provided additional details. The first step in the program, scheduled for completion late in 1960, will involve the addition of cold rolling facilities capable of producing 60-inch sheet including many alloys of aluminum currently beyond Fairmont's capacity.

Major advantages anticipated from the initial phase of the program will be a substantial reduction of the company's production costs and a broadening of the Fairmont aluminum product line.

The principal renovation now underway at the cold end of the mill consists of the installation of a two-stand 77-inch-wide 4-hi rolling mill and a single stand 77-inch-wide 4-hi rolling mill. Strip with a minimum thickness of .006-inch will be rolled at high speeds.

The new mill will make it possible for Fairmont to meet all specification requirements of users of aluminum sheet in non-heat-treatable alloys.

Expansion of Fairmont's cold rolling facilities follows the completion earlier this year of a major alteration of the company's hot line. Mill operations were relocated in order to provide a continuous production line. Now the company's sales organization will be expanded.

Within the past two years Fairmont has strengthened its sales and distribution organization through the addition of sales personnel in its district offices and the opening of new field offices in Pittsburgh, Cleveland, Cincinnati, Boston, Grand Rapids, Gainesville (Ga.), Detroit and Memphis.

The recent location of warehouses in St. Louis, Dayton and Chicago will be followed in the near future by the establishment of eight additional warehouses, thereby enabling the company to serve all major consuming areas.

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Titanium Bellows Out-Perform Gold Plated Jobs

Seamless bellows made of titanium are being used in packless valve stem assemblies made by Fulton Sylphon Division, Robertshaw-Fulton Controls Co., Richmond 19, Va. They are being produced for a homogeneous reactor project at Oak Ridge National Laboratories.

The assemblies are being used in an all-titanium primary reactor loop designed to carry a highly corrosive uranyl sulphate solution at high temperature and pressure. Gold plated bellows proved to be unsatisfactory.

Performance requirements were unusually high for the bellows assemblies. Specifications called for operation at 300° C at pressure of 2500 psig (constant), with ⅛-inch stroke, spring rate not to exceed 1250 lbs. per inch. Outside diameter of the finished bellows is about 1¼ inch.

Problems encountered in manufacture of the bellows concerned basic difficulty in forming titanium, because of its low elongation properties. The bellows were made from grade 55 sheet titanium, and are believed to be the first ever made from the light metal.

Magnesium Association Will Convene In New York

The Magnesium Association will hold its 15th annual convention at the Hotel Roosevelt in New York, October 19th and 20th, according to Otis Grant, vice president of Magnode Products Co., Trenton, Ohio, and president of the association.

"Approaching the end of what appears will be the largest peacetime year for magnesium product sales, there could be no better time to review developments in magnesium technology of the past few years," Grant said.

In addition to representation from American and Canadian producing and fabricating companies, advance inquiries from abroad indicate that groups from the United Kingdom and Scandinavian countries will attend, as well as individuals from Israel and Italy. There might even be U.S.S.R. representation, the association reports.

Financial Briefs

Sharp Increase in Kaiser's 2nd Quarter Earnings

Net earnings of $9,016,000 during the second quarter of 1959 were reported by Kaiser Aluminum & Chemical Corp. Earnings for the same period last year were $5,414,000.

Net sales for the second quarter were $124,060,000, compared with $98,543,000 for the '58 quarter. The latter figure included sales of aluminum and bauxite under government contracts amounting to $17,600,000. The 1959 quarter included no government contract sales.

The improved sales reflect some inventory buying as well as the upturn in general business activity, the company reported.

Revere's Primary Aluminum Picture Looks Brighter

The primary aluminum business of Revere Copper & Brass Inc. showed a "slight profit" in the first half of 1959 in contrast to heavy charge-offs made in 1958 during the start-up period. Generally, aluminum sales increased substantially during this period.

Overall net income (including copper and brass business) for the first half was $5,306,453, equal to $1.99 per share on the 2,657,406 shares of common stock

en outstanding. This compares with 2,093,132 for the first six months of 958, when comparable earnings per are were 79 cents, and included Re-ere's share of the pre-operating and art-up costs of Ormet Corp. (jointly wned by Olin Mathieson Chemical orp. and Revere) totaling $1,772,764, 33 cents per share after taxes.

For the first half, sales totaled $125,-26,038, an increase of 43% over the me period in 1958.

eynolds 2nd Quarter Sales nprove First Half Net

Net sales of $239,485,769 netted a rofit of $19,768,937 for Reynolds Met-s Co. in the first half of 1959. This ompares with a net of $19,210,266 from les totaling $222,608,812 during the me period last year.

Net sales in the second quarter of 959 amounted to $127,605,687, com-ared with $106,863,164 for the same 958 period and $111,880,082 for the rst quarter in '59.

awneer Reports Record ales in First Half

Sales volume for the second quarter s well as the first half of 1959 were the rgest in the history of Kawneer Co., iles, Mich.

Second quarter sales amounted to 9,303,000 for a 52% increase over sales f $6,106,000 for the same period in 8. Earnings for the second quarter ere $424,000, or 47c per share, com-ared to $145,000, or 16c per share for 958's second quarter.

For the first six months of 1959, sales ere $16,900,000, a 38% increase over 8. Earnings for this period amounted o $657,000, or 73c per share compared o earnings of $232,000 or 26c per share or last year's first half.

lin Mathieson Whittling luminum Operation Losses

In the first six months of 1959, losses fter taxes from Olin Mathieson's alu-inum operations totaled about 22c a hare. Shareholders were informed that osses will probably continue at a liminishing rate through the rest of 959.

Olin's rolling mill is not yet com-lete. The company therefore antici-ates start-up expenses and losses.

Ormet Corp., a jointly owned subsid-ary of Olin Mathieson and Revere opper & Brass, is producing primary luminum at a rate higher than pro-ected capacity levels and at lower costs han were forecast.

Ormet's costs include special amorti-ation and depreciation charges which will permit retirement of its indebted-ness at the rate of $20 million a year. n the first half of 1959, $10 million of his debt was paid off.

Alcoa Has Good First Half

Net income of Aluminum Co. of America for the first half of 1959 totaled $28,936,333. Net for the same period last year was $19,471,908.

First half earnings amounted to $1.32 per common share, as compared with 88c per share in the same period in '58.

Sales and operating revenues for the first six months of 1959 were $424,910,806, compared to $366,595,129 in '58.

Inventory Buying in 2nd Quarter Increased Aluminium Ltd's Net

Aluminium Limited earned $10,570,000, equal to 35c per share, in the first half of 1959, according to Nathanael V. Davis, president. This compared with $10,451,000, or 35c per share in the same period of '58.

Second quarter earnings this year were $8,260,000 compared to $5,120,000 in the second quarter of '58, and $2,310,000 in the first quarter of '59. Earnings are stated after preferred dividends of subsidiary companies.

"Consolidated sales of aluminum in all forms and from all sources were 172,000 tons in the second quarter of 1959 compared to 124,000 tons in the first quarter and 150,000 tons in the second quarter of last year," Davis reported. He added that aluminum prices were lower this year.

"Although the company has noted a continuing improvement in demand, management believes the volume of sales in the second quarter in the U.S. market was increased by inventory buying," he said.

Aluminum Co. of Canada, Ltd., whose accounts are consolidated with those of the parent company, reports six months net income, before preferred dividends, of $5,604,053, compared to $9,954,666 in the first half of '58.

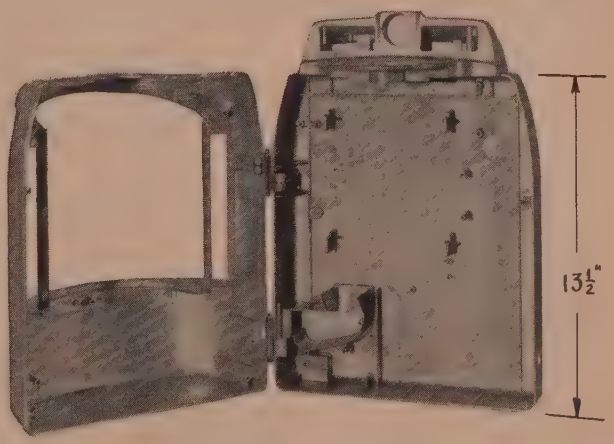
Limited's consolidated sales of all products increased to $184,593,000 from $174,625,000 in the first half of 1958.

Record Earnings for United Pacific Aluminum

Sales of United Pacific Aluminum Corp. for the three months ended June 30, 1959 were $2,037,187, and profits were $95,387. This compared to sales of $1,594,812 and profits of $67,001 for the same period in 1958—an increase of 27½% in sales and 42% in profits.

On the basis of this record net, earnings per share in the first quarter of UPA's fiscal '59 were 20.5c, as compared with 14.4c for the same period last year.

New production facilities soon coming in will increase UPA's capacity of cold rolled aluminum coil from 1,200,000 pounds to about 3,600,000 pounds per month, and of enameled aluminum coil, from 800,000 pounds to about 2,000,000 pounds per month.



Die Castings with sweeping curves and intricate detail are "born to shape" each time. In this assembly, Zinc and Aluminum die castings are combined with finishes most advantageous to that material.

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Hampden Brass & Aluminum Co. 77
Madison-Kipp Corp. 33

CASTINGS, ALUMINUM, MAGNESIUM
Light Alloys, Ltd. 49

CHEMICAL COATINGS, ALUMINUM
Amchem Products, Inc. 23
Conversion Chemical Corp. 81
Eastman Chemical Products, Inc. 59

DIE STEELS, EXTRUSION
Latrobe Steel Co. 35

DISTRIBUTORS, ALUMINUM
Aluminum Mill Supply Corp. 12
Aluminum Transatlantic, Inc. 20
Jones & Laughlin Steel Warehouse Div. 25
Kaiser Aluminum & Chemical Corp. 60, 61
Precision Steel Warehouse, Inc. 82
Production Metals, Inc. 22
Joseph T. Ryerson & Son 8
Whitehead Metals, Inc. 51

EXTRUSIONS, ALUMINUM
Benson Aluminum Co., Inc. 16
General Extrusions, Inc. 75
Harvey Aluminum 45
Southern Extrusions, Inc. 76
Wells Aluminum Corp. 46, 47

EXTRUSIONS, MAGNESIUM
The Dow Metal Products Co. 28, 29

LUBRICANTS for ALUMINUM
Grafo Colloids Corp. 18

PIG, INGOT, BILLET
Aluminium Limited 3rd Cover
Federated Metals Div. 21
Harvey Aluminum 10

PLASTIC ACCESSORIES for ALUMINUM FURNITURE
Impex Corp. 58

PRECOATED COIL
Coated Materials Div. 10

REFRACTORY CONES for TAP-OUT PLUGS
Refractory Products Co. 18

REFRACTORY LINING MATERIALS
H. K. Porter Co., Inc. 13

SCRAP METAL BUYER
Lefton Metals Co. 24

SCREW MACHINE ROD
Bridgeport Brass Co. 67
Olin Aluminum 55

SHEET, ALUMINUM
Anaconda Aluminum Co. 11
Fairmont Aluminum Co. 27
Quaker State Metals Corp. 17

SHEET, ALUMINUM, COILS
Aluminum Foils, Inc. 3

TOOLING PLATE, ALUMINUM
Reynolds Metals Co. 5,

TUBE, ALUMINUM
Wolverine Tube Div. 1

TUBED SHEET, ALUMINUM
Olin Aluminum 4

WELDING WIRE, ALUMINUM
All-State Welding Alloys Co., Inc. 8

WIRE, ALUMINUM
Nichols Wire & Aluminum Co. 4th Cover

X-RAY FILM
Eastman Kodak Co. 3

EQUIPMENT & SERVICES

ANODIZING SOURCE
Colors, Inc. 1

BILLET CASTING MACHINE
Hunter Engineering Co. 1

DIE CASTING MACHINES
Cast-Master H.P.M. Div.

DIES, EXTRUSION
Moczik Tool and Die Works 3
PMD Extrusion Die Co. 4

DRAW BENCHES for ALUMINUM
Aetna-Standard Div. 5

EXTRUSION BILLET HEATERS
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Michigan Roll Form, Inc. 1

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And here's a market—the light metals industry—that's not only specific, but also growing fast. The industry is summarized below, showing the 25,339 plants by industry category and by region. Every one of these plants processes and/or uses aluminum, magnesium, or titanium in the manufacture of end products.

CENTRAL STATES

BUILDING INDUSTRY	East-N. Central	West-N. Central	East-S. Central	Total
CONSUMER DUR. GOODS	1759	768	281	2808
CONTAINERS & PKG.	728	175	73	976
ELECTRICAL INDUSTRY	198	50	12	260
MACH. & EQUIP. (Non-Elec)	678	114	43	835
SCIENTIFIC & TECH. INST.	1065	271	58	1394
TRANS. & PARTS	323	54	13	390
ORDNANCE & MILITARY	708	142	53	903
LIGHT METALS PROC.	22	5	9	36
MISCELLANEOUS INDUS.	2663	461	184	3308
Area Totals:	363	80	31	474
	8507	2120	757	11,384

WESTERN STATES

BUILDING INDUSTRY	Mountain	Pacific	West-S. Central	Total
CONSUMER DUR. GOODS	163	621	481	1265
CONTAINERS & PKG.	18	148	61	227
ELECTRICAL INDUSTRY	5	63	30	98
MACH. & EQUIP. (Non-Elec)	14	183	46	243
SCIENTIFIC & TECH. INST.	21	211	107	339
TRANS. & PARTS	14	74	32	120
ORDNANCE & MILITARY	40	310	101	451
LIGHT METALS PROC.	7	30	5	42
MISCELLANEOUS INDUS.	91	642	289	1022
Area Totals	9	43	29	81
	382	2325	1181	3888

EASTERN STATES

BUILDING INDUSTRY	North-east	Middle Atlantic	South Atlantic	Total
CONSUMER DUR. GOODS	436	1681	760	2877
CONTAINERS & PKG.	155	459	164	778
ELECTRICAL INDUSTRY	48	148	44	240
MACH. & EQUIP. (Non-Elec)	247	589	105	941
SCIENTIFIC & TECH. INST.	204	599	98	901
TRANS. & PARTS	113	280	51	444
ORDNANCE & MILITARY	123	300	143	566
LIGHT METALS PROC.	15	22	17	54
MISCELLANEOUS INDUS.	656	1604	424	2684
Area Totals:	127	403	52	582
	2124	6085	1858	10,067

25,339 PLANTS

A market survey . . .

. . by Modern Metals defined and charted this industry, and odern Metals' circulation list is based on this survey. Here, then, the most accurate and comprehensive light metals industry list existence. Only Modern Metals has this dynamic list, made up tirely of manufacturing plants, and only Modern Metals is read every one of these plants. That's why Modern Metals is by far the most efficient advertising medium for companies that supply ma terials, equipment and services to light metals processors and user

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Looking Ahead

It's a good bet that the steel industry will be back in production by Labor Day. Reasons: Customers will be pressuring Big Steel to settle, and steelworkers will be grumbling at the union bosses. Perhaps more important, Eisenhower won't want the steel mills to be idle when Krushchev visits the U. S. in September. So don't overlook the possibility of Ike invoking the Taft-Hartley Act to call off the strike for three months.

Meanwhile the copper workers will have settled their strike, and aluminum producers will doubtless settle along the lines of the new steel contracts. Auto makers' model changeovers will come early and quick if they get enough steel. So the stage is set for a bustling and big fourth quarter.

As our front cover shows, output of aluminum wrought products and castings really recovered in the second quarter. We projected the July figures, but may have been too conservative. No question about it, July shipments will break all records. August is tough to figure because bookings at mid-month are coming in faster than anticipated. Best guess is a 25% drop-off from July, with the September order pattern showing good strength. If strikes are over, September could be a bang-up month.

Sheet, plate and foil shipments in the first half of '59 totaled 452,000 tons, as shown on the front cover. This was a 27% gain over last year's second half. The 250,000 tons of extrusions and tube shipped in the first half exceeded the previous six-month total by 14%; and shipments of 210,000 tons of castings in this year's first half topped last year's last half by 37%.

More than 912,000 tons of aluminum sheet, plate, foil, extrusions, tube, and castings were shipped in the first six months — a 25% increase over the 727,500 tons of these aluminum products shipped in the last half of '58. With these three categories traditionally accounting for around 85% of all aluminum product shipments, the total in the first half approached 1.1 million tons.

With the uptrend continuing, aluminum seems certain to rack up a record year in '59. Total consumption could come close to 2.5 million tons. That would be a fat 25% higher than the 2 million tons shipped in 1956.

Big battle for household foil markets is shaping up among the producers. The first skirmish was touched off in the last week of July when Reynolds ran ads in 100 newspapers announcing that Reynolds Wrap was "Now over 50% stronger at no increase in price." A few days later, Alcoa held a press party at which it unveiled its new super-strength foil — "up to 10 stronger than any other foil on the mark While Reynolds got the publicity "beat," Al was there with the goods. Its new super- was already on grocery shelves throughout country, while Reynolds' improved prod would not be available to consumers until m August. Kaiser Aluminum, meanwhile, in cated that embossing gives Kaiser quilted foi strength advantage over competing products

But Alcoa and Kaiser have a long way to go to ov take Reynolds in this field. Reynolds comma an estimated 60% of the $62 million-a-y household foil business. Alcoa has about 19 Kaiser around 18%.

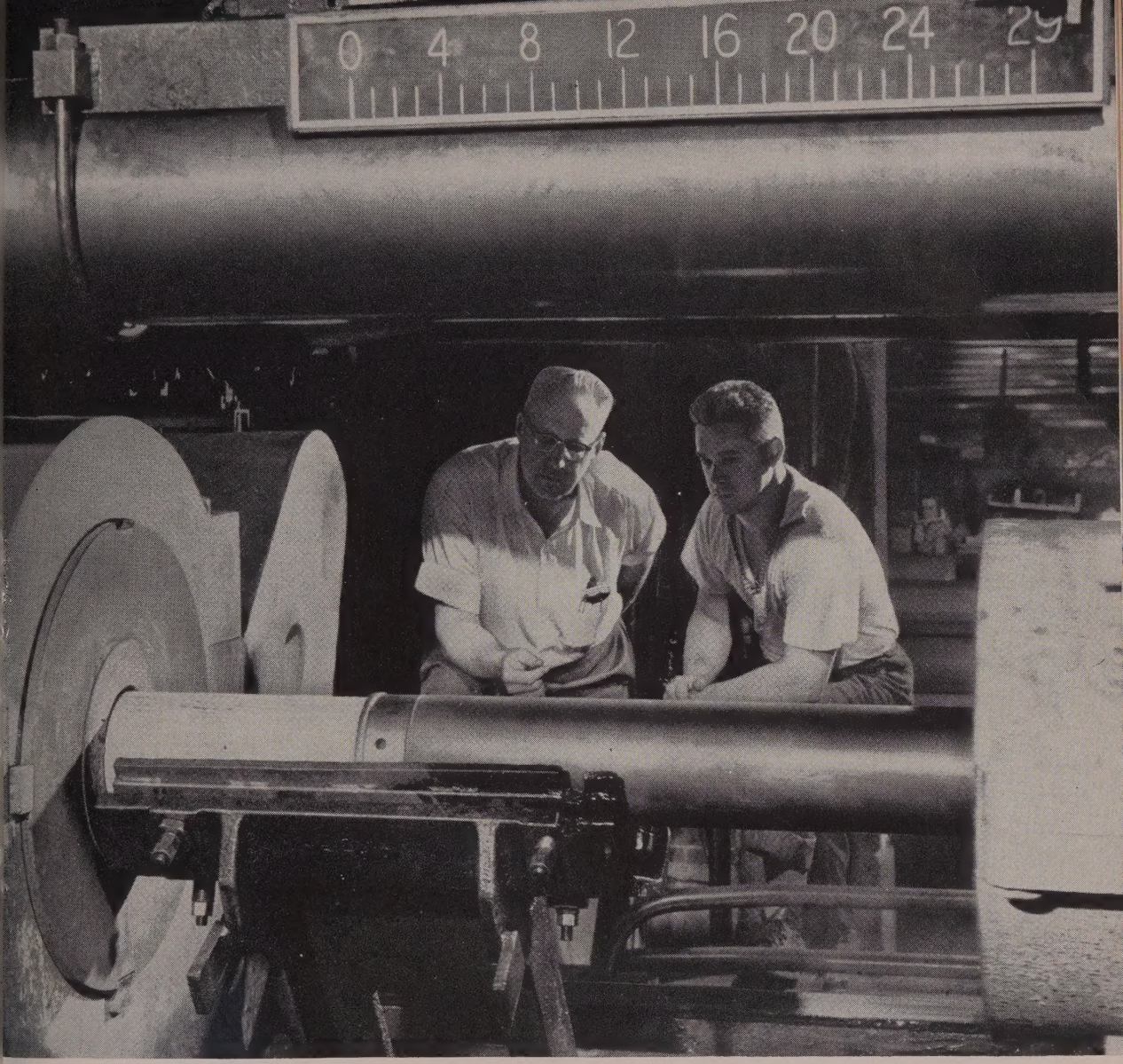
Use of foil laminations will jump 50% in the next f years, according to the Laminated Foil Ma facturers Association. This would put total c sumption of foil laminations at 150 mill pounds by 1964, or about 30 billion square f of foil covered material for cans, cartons, etc

Aluminum distributors predict a 22% increase in th sales of aluminum mill products in 1959, co pared with last year's sales. First quarter v ume was about 20% above the level of last yea like period; second quarter sales gained s more; and most distributors expect another crease for the rest of the year. Warehouse sa of sheet and plate in the second quarter gain 16% over the first quarter level. Sales of r bar, wire and structurals averaged 9% higher the same period, while tubing was up 9% a sales of extrusions averaged 11% higher th the first quarter rate. The distributors s veyed see the second half bringing an 8% r in sales of sheet and plate; about 9% in r bar, wire and structurals; something like 5% tube; and a 7-8% increase in sales of extrusio

Salvage of aluminum scrap will total 450,000 tons t year, according to the Aluminum Smelters R search Institute, and the average recovery r will rise to 750,000 tons annually by 1965. T estimate for this year includes some 350,000 to of new scrap and 100,000 tons of obsolesce The total of 450,000 tons will be nearly doul the scrap recovered in 1950. Smelters have co verted some 3.5 million tons of aluminum scr into ingot since 1948, ASRI reported, and w recover another 7.5 million tons within the ne ten years. The supply of new scrap will rise 500,000 tons annually by 1965, while the supp of obsolescent will reach 200-250,000 tons.

Titanium edged another step closer to stainless st markets this month when Dupont shaved 2 off the price of Grade A-1 sponge. New pri effective August 1, is $1.60 a pound. Grade A was trimmed from $1.70 to $1.50. The n prices apply to minimum quantities of 100 lb f.o.b. Newport, Del.

— The Edit



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